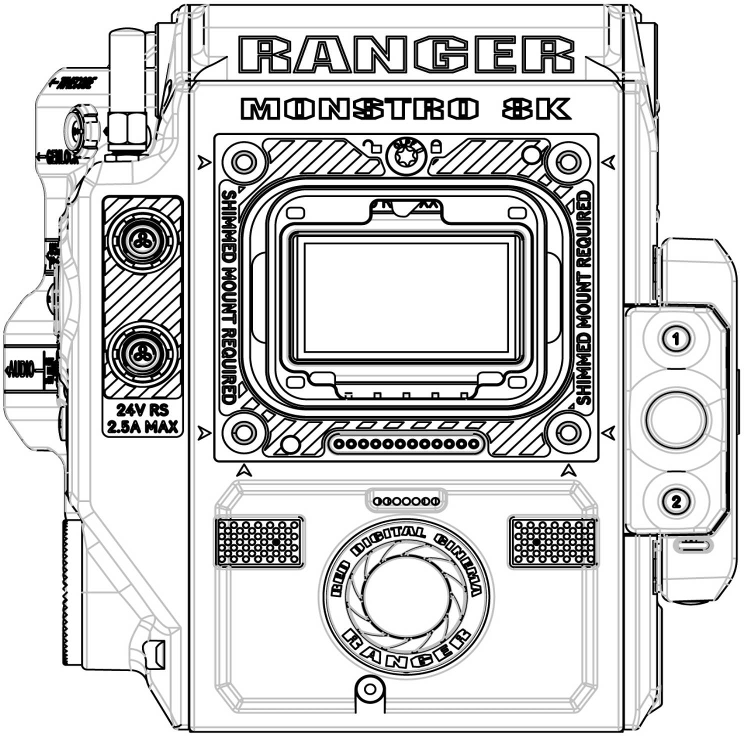
RED RANGER
OPERATION GUIDE


RANGER
MONSTRO 8K
SHIMMED MOUNT REQUIRED
SHIMMED MOUNT REQUIRED
24V RS
2.5A MAX
GENLOCK
AUDIO
1
2
RED DIGITAL CINEMA
RANGER

MONSTRO 8K VV | V7.2

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COMPLIANCE STATEMENTS

INDUSTRIAL CANADA EMISSION COMPLIANCE STATEMENTS

This device complies with Industry Canada license- exempt RSS standards RSS 139 and RSS 210. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device. This Class A digital apparatus complies with Canadian ICES-003.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement. Cet appareil numérique de la classe [A] est conforme à la norme NMB-003 du Canada.

CAN ICES-3 (A)/NMB-3(A)

FEDERAL COMMUNICATIONS COMMISSION (FCC) STATEMENTS

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non- approved equipment or unshielded cables is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to the equipment without the approval of manufacturer could void the users authority to operate this equipment.

CAUTION: Exposure to Radio Frequency Radiation. The device shall be used in such a manner that the potential for human contact is minimized. This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

CAUTION: If the device is changed or modified without permission from RED, the user may void his or her authority to operate the equipment.

NOTE: This device complies with Part 15 of the FCC Rules. Operations subjected to the following two conditions (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including that may cause undesirable interference.

AUSTRALIA AND NEW ZEALAND STATEMENTS

RED declares that the radio equipment described in this document comply with the following international standards.

- IEC 62368-1 – Product Safety
- ETSI EN 300 328 – Technical requirement for radio equipment

RED declares digital devices described in this document comply with the following Australian and New Zealand standards.

- AS/NZS CISPR 32 Electromagnetic Compatibility
- AS/NZS 61000.3.2 –Harmonic Current Emissions
- AS/NZS 61000.3.3 –Voltage Changes, Voltage Fluctuations and Flicker

JAPAN STATEMENTS

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI–A

GITEKI CERTIFICATION

This equipment contains specified radio equipment that has been certified to the Technical Regulation Conformity Certification under the Radio Law.

本機器は、電波法に基づく技術基準適合証明等を受けた特定無線デバイスを使用しております。

Ⓡ005-101325

EUROPEAN UNION COMPLIANCE STATEMENTS

RED declares that the radio equipment described in this document comply with the EMC Directive (2014/30/EU) and the Low Voltage Directive (2014/35/EU) issued by the Commission of the European Community.

Compliance with this directive implies conformity to the following European Norms (in brackets are the equivalent international standards).

- EN 62368-1 (IEC 62368-1) – Product Safety
- ETSI EN 300 328 Technical requirement for radio equipment
- ETSI EN 301 489 General EMC requirements for radio equipment
- EN 55032 (CISPR 32) Electromagnetic Compatibility
- EN 55024 (CISPR 24) Immunity Characteristics
- EN 61000-3-2 (IEC 61000-3-2) Harmonic Current Emissions
- EN 61000-3-3 (IEC 61000-3-3) Voltage changes, voltage fluctuations and flicker

WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE)

The Waste Electrical and Electronic Equipment (WEEE) mark applies only to countries within the European Union (EU) and Norway. This symbol on the product and accompanying documents means that used electrical and electronic products should not be mixed with general household waste. For proper treatment, recovery and recycling, please take this product to designated collection points where it will be accepted free of charge. Alternatively, in some countries you may be able to return your products to your local retailer upon purchase of an equivalent new product.

Disposing of this product correctly will help save valuable resources and prevent any potential negative effects on human health and the environment, which could otherwise arise from inappropriate waste handling. Please contact your local authority for further details of your nearest designated collection point. Penalties may be applicable for incorrect disposal of this waste, in accordance with you national legislation.

For business users in the European Union, if you wish to discard electrical and electronic equipment, please contact your dealer or supplier for further information.

RESPONSIBLE PARTY

RED Digital Cinema

34 Parker

Irvine, CA 92618

USA

SAFETY INSTRUCTIONS

- DO NOT use the camera or accessories near water. Avoid exposing your camera to moisture. The unit is not waterproof, so contact with water could cause permanent damage to the unit as well as electric shock and serious injury to the user. DO NOT use the camera in the rain or under other conditions with high moisture without appropriate protection, and immediately remove power source if camera or accessories are exposed to moisture.

WARNING: To reduce the risk of fire or electric shock, do not expose the camera to rain or moisture.

- DO NOT expose the camera to laser beams, as laser beams may damage the sensor.
- DO NOT expose your camera to excessive vibration or impact (shock). Be careful not to drop your camera. Internal mechanisms may be damaged by severe shock. Mechanical alignment of optical elements may be affected by excessive vibration.
- ELECTROMAGNETIC INTERFERENCE: The use of devices using radio or other communication waves may result in the malfunction or interference with the unit and/or with audio and video signals.
- Clean only using a dry cloth. When cleaning your camera, remember that it is not waterproof and moisture can damage electronic circuitry. DO NOT rinse or immerse any element of the camera, lens or other accessory, keep them dry at all times. DO NOT use soaps, detergents, ammonia, alkaline cleaners, and abrasive cleaning compounds or solvents. These substances may damage lens coatings and electronic circuitry.
- Maintain sufficient ventilation—DO NOT block any ventilation openings or obstruct cooling fan airflow.

CAUTION: Proper camera ventilation requires a minimum 0.5" (1.25 cm) clearance between the camera ventilation openings and external surfaces. Verify that objects that can block the fan intake and exhaust ports do not impede airflow. Failure to permit adequate airflow may result in overheating of the camera, degraded operation and in extreme situations, damage to the camera.

- DO NOT operate or store near any heat sources such as radiators, heat registers, stoves, or any other apparatus that produce heat. Store in a protected, level and ventilated place. Avoid exposure to temperature extremes, damp, severe vibration, strong magnetic fields, direct sunlight or local heat sources during storage. Remove any batteries from the camera before storage. Recommended storage and usage temperatures for your camera, lenses and other accessories are:
  - Operating range: 0°C to 40°C (32°F to 104°F)
  - Storage range: –20°C to 50°C (–4°F to 122°F)
- If there are any performance issues with your camera or accessories when operating within this temperature range, submit a Support ticket at https://support.red.com.
- Lens mounts are NOT HOT SWAPPABLE, meaning you cannot remove or install these items while the camera is turned on. Before installing or removing these items, you MUST turn off the camera. Failure to do so may result in damage to the item or camera that is not covered under warranty.
- DO NOT bypass the third prong of the grounding-type plug on the power cord of the included power adaptor. A grounding-type plug has two blades and a third “grounding” prong. The third prong is provided for your safety. A grounding-type plug shall be connected to an outlet with a protective earthen connection. If the grounding-type plug does not fit into your outlet, do not attempt to modify the plug or outlet, consult a qualified electrician.
- Protect all power cords from being pinched, walked on or driven over by a vehicle. Replace any power cords suspected of sustaining damage due to crushing or other forms physical damage.

Products marked with this symbol are class 2 devices. These devices are not provided with a grounding type plug.

CAUTION: The power cord plug for the included power adaptor is used as the power disconnect. To disconnect all power from the power adaptor, unplug the power cord plug from the wall outlet. During use, the power cord plug should remain easily accessible at all times.

- Lithium-ion batteries may be subject to special handling requirements pursuant to federal and local laws. Refer to specific shipping instructions included with your battery regarding proper transport of your battery. Do not handle your battery if it is damaged or leaking. Disposal of batteries must be in accordance with local environmental regulations. For example, California law requires that all rechargeable batteries must be recycled by an authorized recycle center. Storing batteries fully charged or in high temperature conditions may permanently reduce the life of the battery. Available battery capacity may also be temporarily lessened after storage in low temperature conditions.

WARNING: DO NOT expose the battery to excessive heat.

WARNING: Danger of explosion if an incorrect battery is charged with the RED Charger or is used to power the camera and accessories. Replace only with the same or equivalent type battery.

CAUTION: Refer all service and repair to qualified RED service personnel. To reduce the risk of electric shock, and damage to the camera or accessories, DO NOT attempt to perform any servicing other than any procedures that are recommended in the operating instructions.

INDOOR USE ONLY: This device is designed for use indoors only.

BATTERY STORAGE AND HANDLING

WARNING: Failure to read, understand, and follow these instructions may result in overheating, chemical leakage, smoke emission, fire, or other potentially harmful results.

- Always follow proper battery handling and storage practices. Improper handling and/or failure to abide by proper storage instructions may cause permanent damage to batteries, or degrade battery charge holding capacity. Improper handling practices or failure to comply with instructions may also put you at risk.
- Lithium-Ion batteries, like the REDVOLT®, REDVOLT-V, REDVOLT XL, and RED BRICK®, self-discharge over time. When storing for long periods of time, store batteries separately from the camera or charger and remember to charge batteries to a capacity level of 40% to 60%. If batteries will be stored for long periods of time, RED recommends that you check the charge level at least once every six (6) months, and recharge batteries to a capacity level of 40% to 60%.
- When not in use, remove the battery from the camera or charger and store the battery in a cool, dry place. Avoid extreme hot temperatures (such as inside a hot car), corrosive gas, and direct sunlight. The optimal storage temperature for batteries is between –20°C to 20°C (–4°F to 68°F).

WARNING: Batteries stored in a discharged state for long periods of time may self-discharge and lose the ability to hold a charge.

WARNING: If recharging operation fails to complete even when a specified recharging time has elapsed, immediately stop further recharging.

- DO NOT store batteries in a fully charged state for extended DO NOT store batteries in a fully charged state for extended periods of time.
- DO NOT store batteries in a fully discharged state for extended periods of time.
- DO NOT store batteries in the camera or in a charger for extended periods of time.
- DO NOT use batteries for purposes other than their intended use.
- DO NOT store batteries in extreme hot or cold temperatures.
- DO NOT store batteries in direct sunlight.
- DO NOT use third-party chargers with your RED batteries.
- DO NOT disassemble or modify the battery.
- DO NOT overcharge batteries. Overcharging may increase internal temperature beyond the recommended limits and cause permanent damage to the battery.
- DO NOT connect the positive (+) and negative (–) terminals to a metal object such as a wire.
- DO NOT transport or store the battery together with metal objects such as jewelry, hairpins, etc. as they may generate heat if they come into contact with the battery.
- DO NOT discard the battery into fire or heat.
- DO NOT store, use, or recharge the battery near a heat source such as a fire or a heater.
- DO NOT allow the battery to get wet.
- DO NOT pierce the battery with pointed or other sharp objects.
- DO NOT step on, throw, or strike the battery with a hammer.
- DO NOT use a battery that appears to be deformed or damaged.
- DO NOT directly solder the battery.
- DO NOT put the battery into a microwave oven or a pressurized container.
- DO NOT use or subject the battery to intense sunlight or hot temperatures such as in a car in hot weather.
- DO NOT use it in a location where static electricity may be present.
- DO NOT exceed the recharging temperature range of 0°C to 40°C (32°F to 104°F).
- RED recommends that you only use RED chargers to recharge RED batteries.
- Store the battery in a location where children cannot reach it.
- If the battery leaks or gives off a bad odor, discontinue use immediately.
- If the battery gives off an odor, generates heat, becomes discolored or deformed, or in any way appears abnormal during use, recharging or storage, immediately remove it from the equipment or battery charger and discontinue use.
- If electrolyte begins leaking from the battery and comes into contact with your skin or clothing, immediately wash it away with running water. Failure to do this may result in skin inflammation.
- If the battery leaks and the electrolyte reaches the eyes, do not rub them. Instead, rinse the eyes with clean running water and immediately seek medical attention. Failure to do this may result in eye injury.
- If you find discoloration, a bad odor due to leakage, overheating and/or other irregularities when using the battery for the first time, submit a Support ticket at https://support.red.com.

NOTE: For more information regarding RED battery charging and instructions for care, refer to our Terms and Conditions.

SHIPPING DISCLAIMER

Shipment of Lithium Ion cells and batteries is subject to national and international shipping requirements. A Class 9 Certified shipper is required to transport these products within the United States. REDVOLT, REDVOLT-V, REDVOLT XL, and RED BRICK batteries are considered Dangerous Goods. Other products such as REDVOLT AA and RED Li 7.2V batteries may also be classified as Dangerous Goods when purchased in bulk. Applicable laws prohibit the shipping of batteries that are physically damaged. We urge you to look into the formal rules and regulations of shipping Class 9 Dangerous Goods prior to preparing your shipment. For more information on these regulations, visit www.iata.org and www.dot.gov.

For more information, see our FAQs for Dangerous Goods (Regulated Items).

CHAPTER 1:

PRODUCT INTRODUCTION

RANGER
MONSTRO 8K
RED DIGITAL CINEMA PROFESSIONAL
24V RS
2.5A MAX
AUDIO
GENLOCK
1
2
RED DIGITAL CINEMA RANGER

Figure: RED RANGER

RED RANGER is an integrated Large Format 8K camera system offering an all-in-one system for top-tier production use. It features all of the benefits of the MONSTRO 8K VV sensor within a compact and less complex platform for filmmakers. Features like integrated I/O's, 24V power out, shimmed PL Mount, and improved thermal performance offer unmatched versatility as well as peace of mind in challenging shooting environments.

RED RANGER is capable of handling the rigorous strain and robust power needs of high-end studio productions. RED RANGER supports wide input voltage (11.5V to 32V), offers independent SDI and AUX power outputs, and features an integrated XLR audio input. The camera also boasts a larger fan for quieter and more efficient temperature management. RED RANGER is available in two configurations, supporting either V-Lock or Gold Mount batteries.

This section introduces the imaging capabilities and advanced features of the camera system.

This guide is for the following cameras only:

SENSOR TYPE	**CAMERA**
MONSTRO 8K VV	RED RANGER MONSTRO 8K VV (V-Lock) RED RANGER MONSTRO 8K VV (Gold Mount)

R3D FILE FORMAT AND REDCODE

All videos and frames are recorded to the R3D® file format. The R3D file format was developed by RED to provide an efficient and manageable RAW video data format that promotes advanced post production editing capabilities. In the R3D file format, the digital image received from the sensor is formatted as a pixel-defect corrected (but in all other aspects unprocessed) 16-bit per pixel RAW data frame. Each RAW frame, or sequence of RAW frames in a clip, is compressed using a proprietary wavelet based REDCODE® RAW compression, then stored to a RED MINI-MAG®.

RAW data is recorded independently of any RGB domain color processing such as ISO, White Balance, or other RGB color space settings. Instead, color parameters are saved as reference metadata; that is, color is not burned into the recorded RAW data. This recording technique promotes flexibility in RGB color processing, which can be deferred to post production or adjusted in the field, without affecting the recorded RAW data image quality or dynamic range.

REDCODE is a visually lossless, wavelet-based compression codec that reduces R3D RAW files into a manageable size, allowing longer recording times on media. The ability to compress RAW data is one of the significant technologies that RED has brought to the industry.

For more information, see the DSMC Media Operation Guide, available at www.red.com/downloads.

NOTE: REDCINE-X PRO® can create and export .RMD “Look” files which may then be imported as camera monitor path color processing presets. This information is stored as reference metadata, so that these color processing choices can be the default values used in post production. For more information, go to "Looks" on page 93.

SHOOT FOR VIDEO AND STILLS

High resolution video, such as the digital footage captured by the camera, has surpassed the detail necessary to produce professional full-sized prints. Because of the ability to record at high frame rates and resolution, the camera is ideally suited to capture video and still images, simultaneously.

The camera is equipped with a Stills mode that makes it easier to capture stunning images. With presets optimized for stills and Swipe-Up Shortcuts for the RED Touch display, switching from Motion mode to Stills mode is seamless. Using REDCINE-X PRO, or other editing applications supporting the RED SDK, you can pull full resolution still images from R3D files.

POST PRODUCTION

NOTE: Third-party applications may have limited compatibility with R3D files. Third-party developers must use the most recent R3D SDK to offer compatibility with the latest RED firmware.

Many non-linear editing systems (NLEs) can open and edit RED footage. Each NLE version may have specific compatibility requirements, such as camera firmware version or camera type. Before shooting, check all compatibility requirements.

The following programs can be used to open and/or edit R3D files:

- **REDCINE-X PRO**: RED's proprietary NLE. Download REDCINE-X PRO from www.red.com/downloads.
- **Adobe Photoshop**: Can open .R3D files. Requires you to download the RED Adobe Photoshop Installer from www.red.com/downloads.
- **Adobe Premiere Pro**: For more information on compatibility, go to the RED Support site at https://support.red.com.
- **Avid Media Composer**
- **DaVinci Resolve**
- **Edius Pro**
- **Final Cut Pro 7**: Requires you to download the RED Apple Workflow Installer from www.red.com/downloads.
- **Final Cut Pro X**: Requires you to download the RED Apple Workflow Installer from www.red.com/downloads.
- **Vegas Pro**

POST PRODUCTION WITH REDCINE-X PRO

REDCINE-X PRO is a professional one-light coloring toolset, equipped with an integrated timeline and a post effects software collection that provides the ideal environment to review recorded footage, edit metadata, organize projects, and prepare your R3D files. Use either REDCINE-X PRO or a compatible third-party non-linear editing (NLE) application to edit R3D files.

RED TETHER, included in REDCINE-X PRO, allows you to record footage from your camera directly to a computer or an external drive. Using tethering bypasses the need to record to an SSD and offload to a computer later, saving you time. The latest version of REDCINE-X PRO and the REDCINE-X PRO Operation Guide are available for download at RED Downloads at www.red.com/downloads.

NOTE: RED TETHER is included in REDCINE-X PRO build 35 or later.

HDRX AND MAGIC MOTION

HDRX

HDRX® extends dynamic range up to six (6) stops by simultaneously capturing two (2) images of identical resolution and frame rate. The first image is a normally exposed track (A-track), while the second is an underexposed track (X-track) with an exposure value that reflects the additional stops of highlight protection. These tracks are "motion-conjoined" during recording, leaving no time gap between the two (2) exposures. This is different from traditional alternating exposures, which have small gaps between tracks, producing unwanted motion tracks.

MAGIC MOTION

MAGIC MOTION is a post production method that combines two (2) HDRX tracks to create an image with both natural motion blur (from the A-track) and sharper reference (the X-track). MAGIC MOTION produces an image with an extraordinary dynamic range that is not available with any other motion capture camera.

Shooting at 24 fps with a 180° (1/48 sec) shutter on traditional film or digital cameras produces motion blur throughout, which is not the way the human eye observes motion. For example, ask someone to swing their arm. What you would observe in a traditional recording of this action is constant motion blur until the arm stops. However, what your eye sees is both motion blur and a sharper reference of the arm throughout the motion path. MAGIC MOTION creates an image that matches the natural motion observed by the human eye.

ADDITIONAL RESOURCES

The following resources offer additional information about RED, the DSMC system, and the RED community:

- **RED.com**: Check the official RED website for the latest information about RED products.
- **RED Learn Articles**: RED offers in-depth technical articles about RED cameras, post-production, and digital cinematography.
- **RED Downloads**: Go to RED Downloads to download the latest firmware, operation guides, and post-production software.
- **DSMC Toolkit**: Go to RED Downloads to find the DSMC Toolkit, which offers many helpful tools and resources to customize and improve your camera workflow.
- **RED Support**: Check the RED SUPPORT site for FAQs, or to file a support ticket.
- **In-Camera Help**: Select the Help button on an in-camera screen to open up the help for that screen.
- **REDUSER**: Discuss all things RED on the REDUSER third-party forum.

CHAPTER 2:

CAMERA SYSTEM COMPONENTS

NOTE: Lens mounts are NOT HOT SWAPPABLE, meaning you cannot remove or install these items while the camera is turned on. Before installing or removing these items, you MUST turn off the camera. Failure to do so may result in damage to the item or camera that is not covered under warranty.

NOTE: Availability of components listed in this chapter is subject to change at any time.

RED RANGER CAMERA BODY

This section describes the controls, buttons, and features on the RED RANGER camera body. For information on the input/output connectors, go to "Input/Output Connectors" on page 193.

RANGER
MONSTRO 8K
GENLOCK
AUDIO
24V RS
2.5A MAX
RED DIGITAL CINEMA PROFESSIONAL
1
2
RED DIGITAL CINEMA RANGER

Figure: Camera Body Controls and Features

CAMERA BODY CONTROLS AND FEATURES

CAMERA FRONT

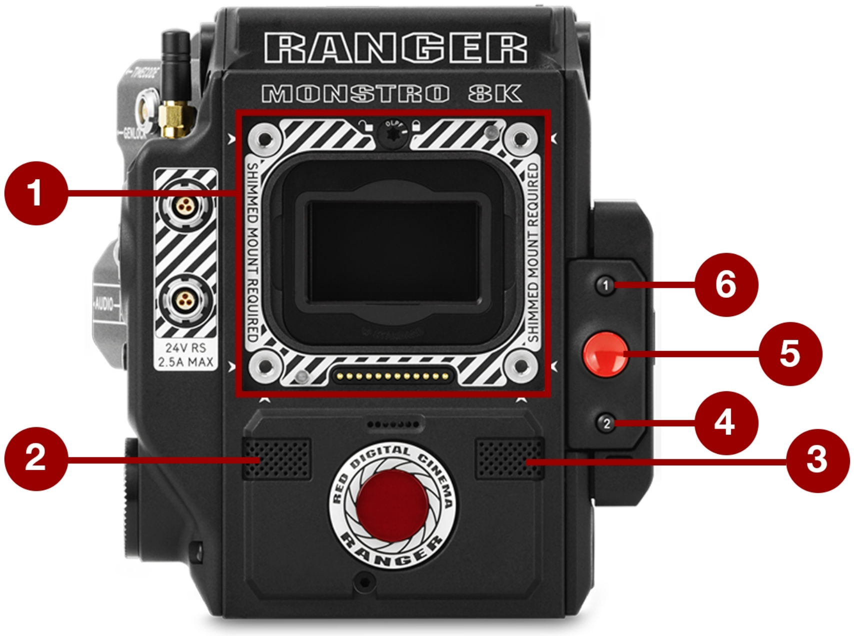

RANGER
MONSTRO 8K
SHIMMED MOUNT REQUIRED
24V RS
2.5A MAX
RED DIGITAL CINEMA
RANGER
1
2
3
4
5
6

Figure: Camera Body Controls and Features

#	ITEM	DESCRIPTION
1	Lens mount area	Attach lens mount
2	Mic 1	Left audio channels: Ch1 and Ch3. Go to "Audio System" on page 143
3	Mic 2	Right audio channels: Ch2 and Ch4. Go to "Audio System" on page 143
4	User Key 2	Programmable key User Key 1 + 2 Press: Eject Media
5	REC Button	Programmable key Full Press: Record Toggle Half Press: AF Start
6	User Key 1	Programmable key User Key 1 + 2 Press: Eject Media

CAMERA TOP

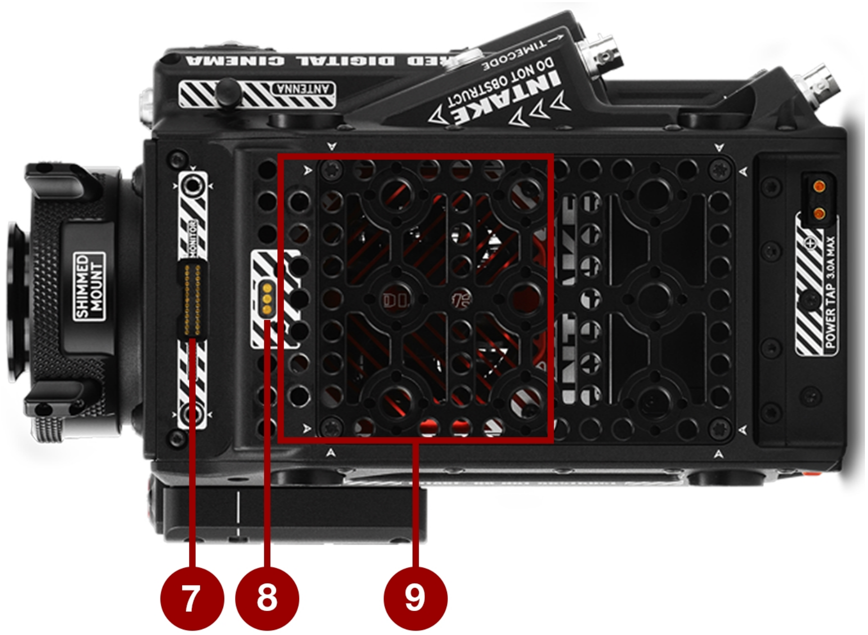

RED DIGITAL CINEMA
ANTENNA
TIMECODE
DO NOT OBSTRUCT
INTAKE
SHIMMED MOUNT
MONITOR
POWER TAP 3.0A MAX
7
8
9

Figure: Camera Body Controls and Features

#	ITEM	DESCRIPTION
7	Primary EVF/LCD Port	Mount a DSMC2 RED Touch LCD, LCD/EVF Adaptor A, or LCD/EVF Adaptor D
8	Top Handle Port	Mount the DSMC2 Top Handle or DSMC2 Outrigger Handle. This is the only mounting option for the DSMC2 Top Handle or DSMC2 Outrigger Handle (it cannot be attached backward)
9	Fan intake	DO NOT block fan intake when the camera is on

CAMERA LEFT

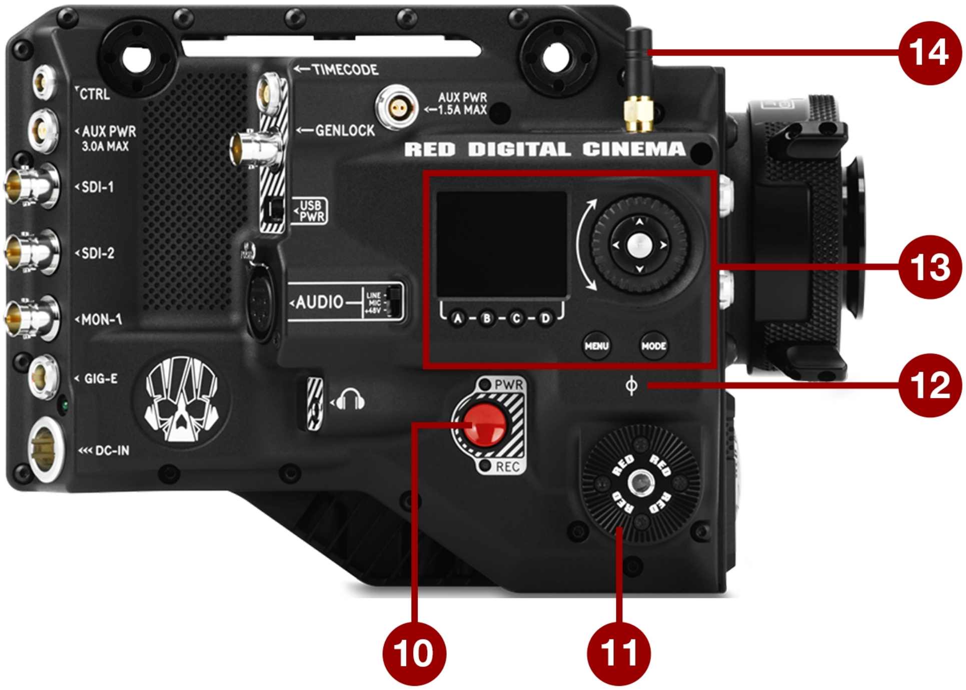

14
CTRL
TIMECODE
AUX PWR 3.0A MAX
GENLOCK
AUX PWR 1.5A MAX
RED DIGITAL CINEMA
SDI-1
USB PWR
13
SDI-2
AUDIO
LINE MIC +48V
A
B
C
D
MON-1
MENU
MODE
GIG-E
PWR
12
DC-IN
REC
10
11

Figure: Camera Body Controls and Features

#	ITEM	DESCRIPTION
10	PWR/REC button	Fully press and hold the **PWR/REC** key for two (2) seconds to turn on/off. When the camera is on, fully press and then release the **PWR/REC** key to toggle record start/stop.
11	Industry-standard rosette	Features an M6 threaded hole in the center; use with cages or accessories that feature rosette-based mounting systems
12	Focal plane marks	Marks align with the sensor plane; pull focus from these marks.
13	Side LCD and Navigation	Go to "Side LCD and Navigation" on page 59
14	Wireless (802.11g) antenna	Uses standard female SMA connector; can be replaced with taller SMA connector antennas

CAMERA RIGHT

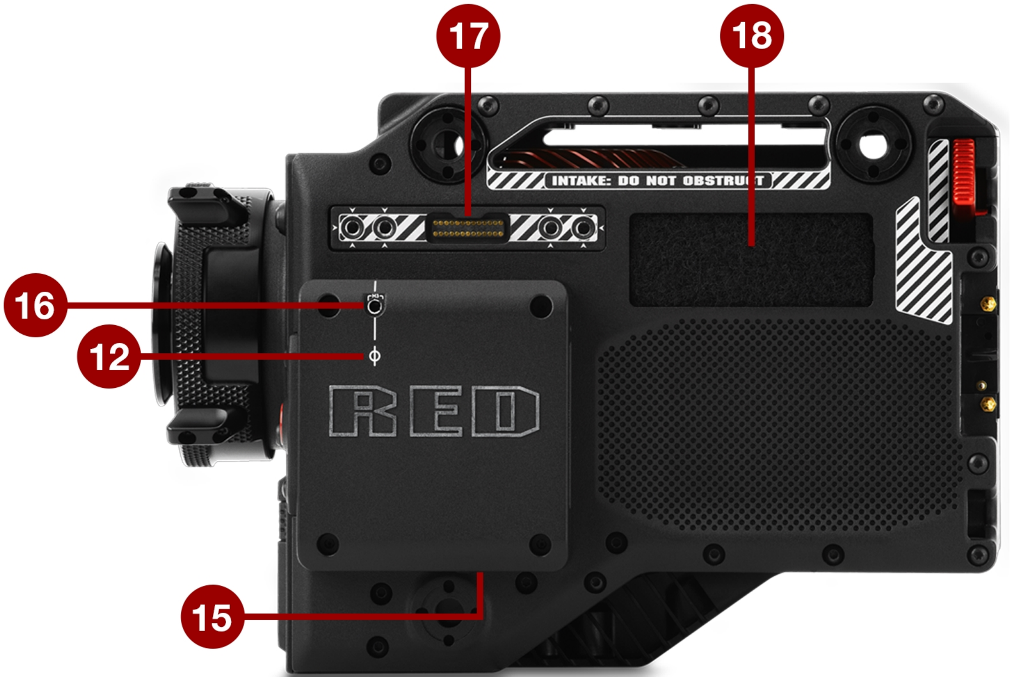


Figure: Camera Body Controls and Features

#	ITEM	DESCRIPTION
12	Focal plane marks	Marks align with the sensor plane; pull focus from these marks.
15	Focus Hook Screw Storage Location[1]	Store the focus hook screw
16	Focus Hook Mounting Point[1]	Mount the focus hook
17	Secondary EVF/LCD Port	Mount a DSMC2 RED Touch LCD or LCD/EVF Adaptor D. The secondary LCD/EVF port and a MON-1 port cannot be used at the same time. Go to "Monitor Preferences" on page 70
18	Hook and loop patch	Rectangle of hook and loop material for attaching labels

[1] Install only the focus hook screw to this mounting point. Damage to the media bay or other components of the camera system caused by installing other devices is not covered under warranty.

CAMERA BACK

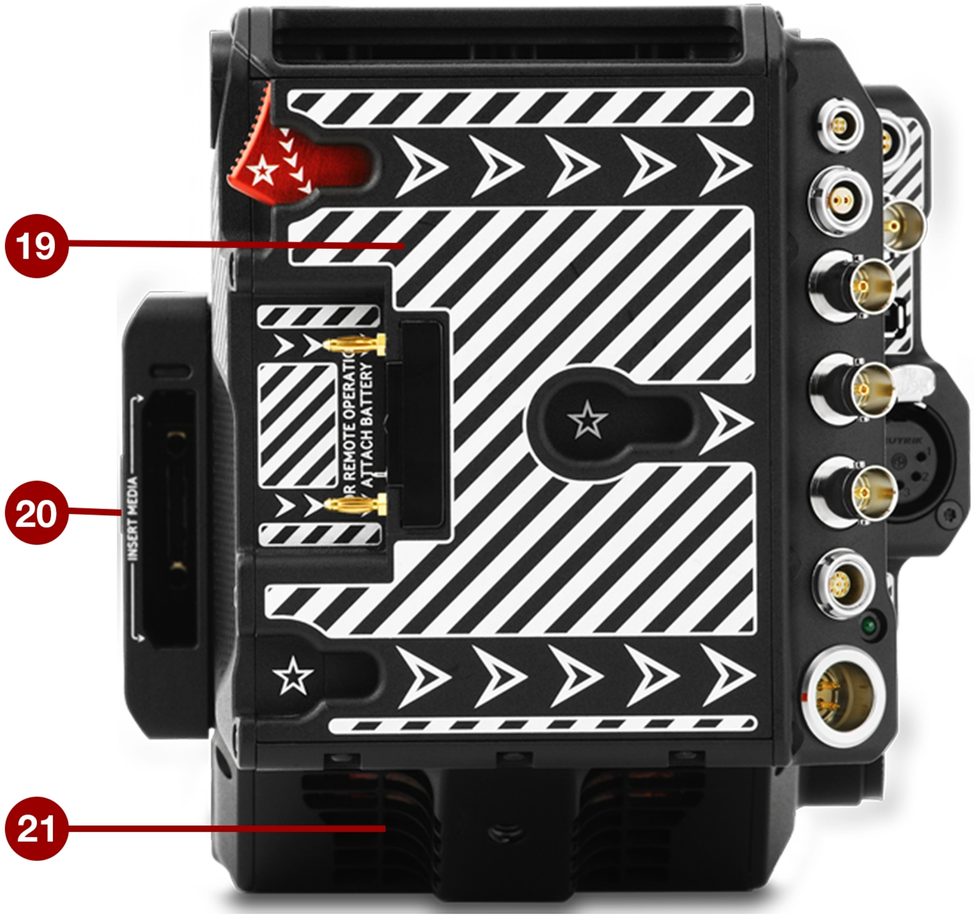

19
20
21
INSERT MEDIA
FOR REMOTE OPERATION ATTACH BATTERY

Figure: Camera Body Controls and Features

#	ITEM	DESCRIPTION
19	Battery mount	Depending on the RED RANGER type, you can attach either a gold mount battery or a v-lock battery
20	Media mount	Mount RED MINI-MAG media
21	Fan exhaust	DO NOT block fan exhaust when the camera is on

CAMERA BOTTOM

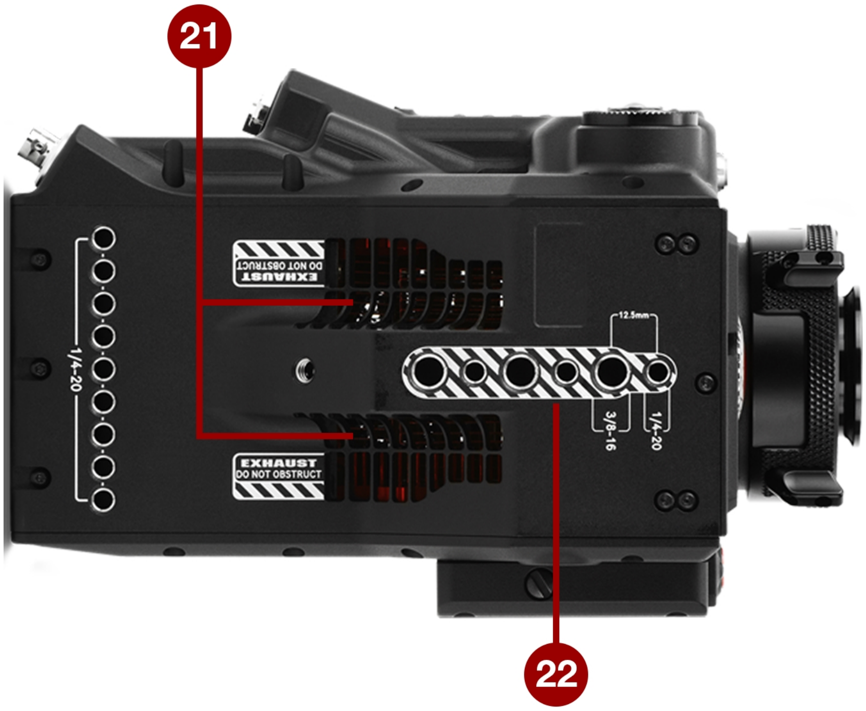

21
EXHAUST
DO NOT OBSTRUCT
1/4-20
12.5mm
3/8-16
1/4-20
EXHAUST
DO NOT OBSTRUCT
22

Figure: Camera Body Controls and Features

#	ITEM	LOCATION	DESCRIPTION
21	Fan exhaust	Back/Bottom	DO NOT block fan exhaust when the camera is on
22	Mounting Points	Bottom	Mount plates, tripods, monopods, etc.

CAMERA BODY LEDS

LEFT SIDE LEDS

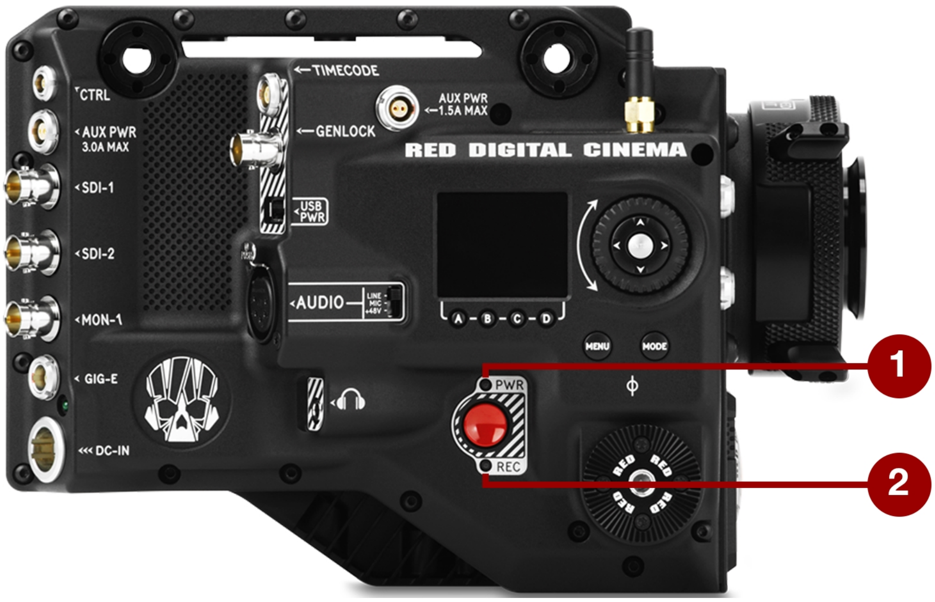

CTRL
AUX PWR 3.0A MAX
SDI-1
SDI-2
MON-1
GIG-E
DC-IN
TIMECODE
GENLOCK
AUX PWR 1.5A MAX
RED DIGITAL CINEMA
USB PWR
AUDIO
LINE MIC +48V
A B C D
MENU
MODE
PWR
REC
1
2

Figure: RED RANGER LEDs, Right Side

NOTE: When the camera is powered only by battery and not AC power, the Power Status LED (PWR) does not turn on. To check the battery charge level, press the button on the battery.

#	LED	COLOR/FLASHING	DESCRIPTION
1	Power Status LED (PWR)	Off	Camera off
		Green	Camera on
		Amber flashing	Camera on; 5 to 10 min of battery time available
		Amber	Camera booting
		Red flashing	Camera on; < 5 min of battery time available
		Red	Camera shutting down
2	Record Status LED (REC)	Off	No media present
		Green	Ready to record
		Amber	Finalizing
		Red flashing (slow)	Media mounted; > 5% and ≤ 10% of media available
		Red flashing (fast)	Media mounted; ≤ 5% of media available
		Red	Recording
N/A	Power Status LED (PWR) and Record Status LED (REC)	Both green flashing	Firmware update in progress
		Both red flashing	Firmware update error

MEDIA BAY LEDS

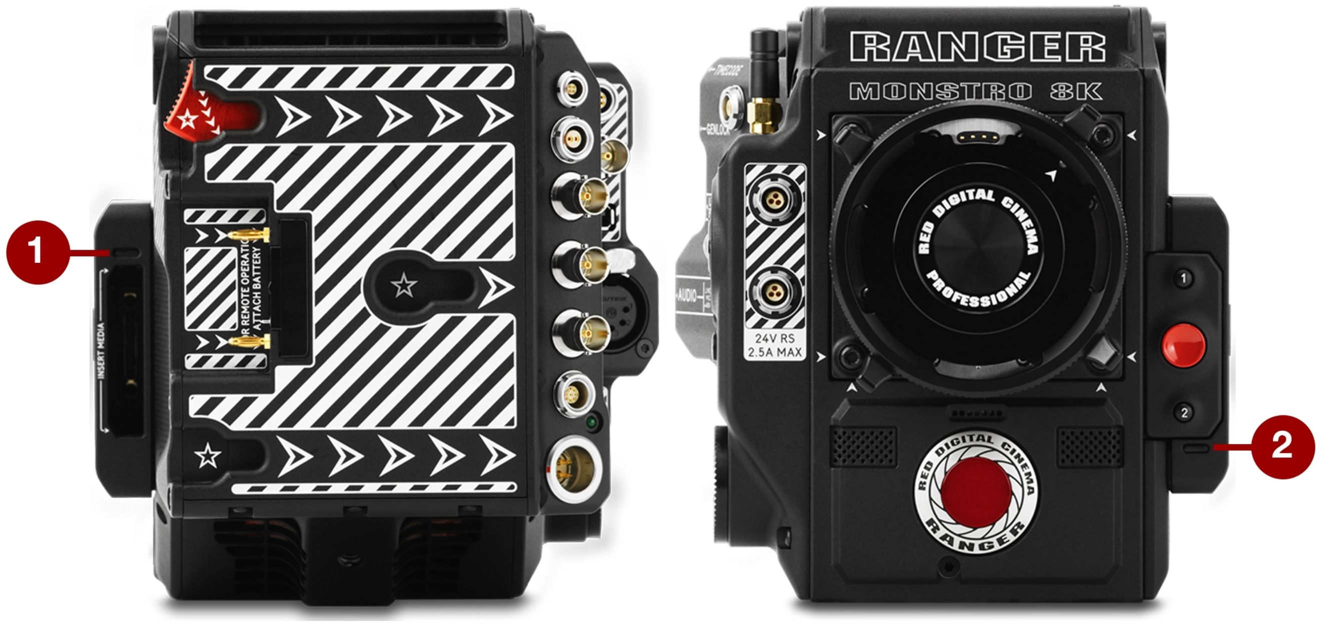

1
2
RANGER
MONSTRO 8K
RED DIGITAL CINEMA PROFESSIONAL
24V RS
2.5A MAX
INSERT MEDIA
RED DIGITAL CINEMA RANGER

Figure: Media Bay LEDs

#	LED	COLOR/FLASHING	DESCRIPTION
1	Media Status LED (Back of media bay)	Off	No media mounted
		Green	Preview; media mounted; > 10% of media space available
		Amber	Record finalizing or playback mode
		Amber flashing (slow)	Formatting media
		Red flashing (slow)	Media mounted; > 5% and ≤ 10% of media available
		Red flashing (fast)	Media mounted; ≤ 5% of media available
		Red	Recording; media mounted; > 10% of media available
2	Record Status LED[1]	Off	Not recording, or media not mounted
		Red	Recording

---

1. For more information on how to enable/disable this LED, go to "Indicator" on page 116. If media is not mounted, this LED is off.

RED MINI-MAG SYSTEM

120GB RED MINI-MAG®
RED

Figure: RED MINI-MAG (120GB)

NOTE: For more information, see the DSMC Media Operation Guide, available at www.red.com/downloads.

RED MINI-MAG® SSDs deliver fast and reliable recording options for your camera. A RED STATION® enables you to connect media to your computer for offloading and editing.

RED offers the following RED MINI-MAG SSDs:

ITEM	PART NUMBER
RED MINI-MAG (120GB)	750-0075
RED MINI-MAG (240GB)	750-0082
RED MINI-MAG (480GB)	750-0090
RED MINI-MAG (512GB) V4[1]	750-0078
RED MINI-MAG (512GB) V5[1]	750-0078
RED MINI-MAG (512GB) V6[1]	750-0078
RED MINI-MAG (960GB)	750-0087
RED MINI-MAG (1TB)[2]	750-0081

1. To see the Model number, go to **Menu** > **Media** > **Device**.
2. The RED MINI-MAG 1TB can take up to 20 seconds to mount to a computer or a camera.

POWER COMPONENTS

The following RED batteries, battery chargers, and power cables are compatible with the RED RANGER:

ITEM	PART NUMBER	NOTES
REDVOLT-V	740-0043	For use with V-Lock
RED BRICK	740-0002	For use with V-Lock
RED RANGER AC Power Adaptor 270W	740-0048	Power adaptor for AC power; 3-pin female XLR
3-PIN XLR-TO-4-PIN 2B POWER CABLE (10')	790-0665	Connects the DC-IN port to the RED RANGER AC Power Adaptor or third-party 24/28V output power, such as Anton Bauer VCLX or Bebob Cube 1200 batteries

DISPLAYS AND ELECTRONIC VIEWFINDERS

RED offers the following displays and electronic viewfinders (EVFs):

NOTE: RED offers multiple mounting solutions for each camera type.

ITEM	RESOLUTION	TILT[1]	SWIVEL[1]	PART NUMBER
DSMC2 RED Touch 7.0" LCD (Woven CF)	1920 x 1136	Total: 180° Forward: 90° Backward: 90°	Total: 360° CW: 180° CCW: 180°	730-0018
DSMC2 RED Touch 7.0" LCD (Aluminum)	1920 x 1136	Total: 180° Forward: 90° Backward: 90°	Total: 360° CW: 180° CCW: 180°	730-0024
DSMC2 RED Touch 4.7" LCD	1280 x 720	Total: 240° Forward: 90° Backward: 150°	No swivel	730-0019
RED Touch 5.0" LCD[2]	800 x 400	Total: 270° Forward: 180° Backward: 90°	Total: 360° CW: 180° CCW: 180°	730-0008
RED Touch 7.0" LCD[2]	1920 x 1136	Total: 180° Forward: 90° Backward: 90°	Total: 360° CW: 180° CCW: 180°	730-0007
RED Touch 9.0" LCD[2]	1280 x 768	Total: 270° Forward: 180° Backward: 90°	Total: 360° CW: 180° CCW: 180°	730-0011
RED Pro LCD 7"[2]	1024 x 600	No tilt	No swivel	730-0009
RED Pro Touch 7.0" LCD[2]	1920 × 1136	No tilt	No swivel	730-0025
DSMC2 Touch 7.0" Ultra-Brite LCD[2, 3]	1920 x 1200	No tilt	No swivel	730-0026
DSMC2 RED EVF (OLED)[2]	1920 x 1080	N/A	N/A	730-0021
BOMB EVF® (LCOS)[2]	1280 x 784	N/A	N/A	730-0004
BOMB EVF (OLED)[2]	1280 x 1024	N/A	N/A	730-0010

1. Approximate measurements.
2. Using this display with RED RANGER requires a DSMC2 LCD/EVF Adaptor A or DSMC2 LCD/EVF Adaptor D.
3. The DSMC2 Touch 7.0" Ultra-Brite LCD requires that your camera is on firmware v7.2 or later.

RED LCDS

RED displays provide important camera parameters on the graphical user interface (GUI) and offer a variety of monitor viewing options. RED touchscreen displays enable you to use gestures to navigate menus and adjust camera parameters. RED displays feature 8-bit RGB, 4:4:4 progressive scan, providing up to 16.7 million colors and up to 70% NTSC color gamut (83% coverage for the DSMC2 Touch 7.0" Ultra-Brite LCD).

LCD PRECAUTIONS

WARNING: DO NOT use a RED display as a handle to lift or carry the camera. Damage to a RED display or other components of the camera system caused by using the display as a handle are not covered under warranty.

WARNING: DO NOT use the threaded holes in the RED Touch LCD base to mount the display to the camera. Damage to a RED display or other components of the camera system caused by using these threaded holes is not covered under warranty.

WARNING: DO NOT try to turn an LCD past its tilt or swivel range. Damage to a RED display or other camera components caused by excessive force is not covered under warranty. For more information on the tilt and swivel range for each display, go to "Displays and Electronic Viewfinders" on the previous page.

BOMB EVFS

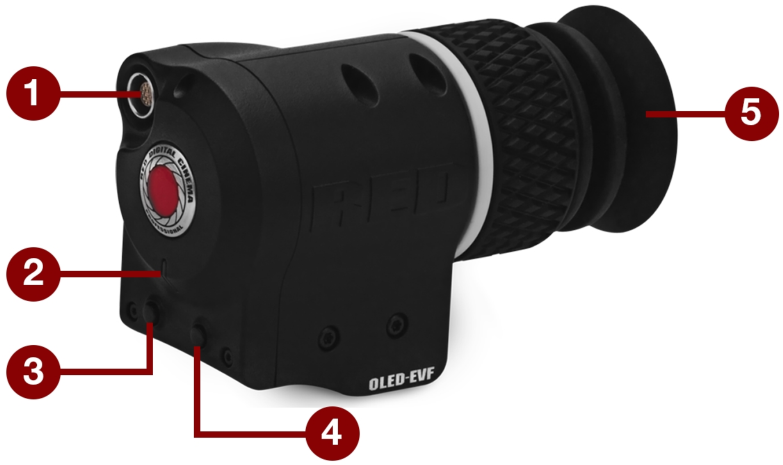


Figure: BOMB EVF (OLED)

The BOMB EVF (LCOS) and BOMB EVF (OLED) deliver specialized viewing solutions for the camera. The BOMB EVF (LCOS) is a high-definition, lightweight, and low-profile viewfinder. The BOMB EVF (OLED) uses OLED technology, providing deeper blacks and more color accurate images.

ITEM	CONTRAST RATIO	DIOPTER RANGE
BOMB EVF (LCOS)[1]	1000:1 typical	2.0 to –5.0.1
BOMB EVF (OLED)[1]	>10,000:1 typical	2.0 to –5.0.1

1. Using these displays with a DSMC2 camera requires a DSMC2 LCD/EVF Adaptor A.

WARNING: DO NOT point the BOMB EVF (OLED) eyepiece at direct sunlight. Continued exposure to direct sunlight may damage the EVF. Point the eyepiece away from sunlight when not in use. Damage to the BOMB EVF (OLED) caused by continued exposure to direct sunlight is not covered under warranty.

BOMB EVF FEATURES

#	FEATURE	DESCRIPTION
1	EVF Connector	Custom digital video and power interconnection between the camera and RED EVF; Pinout not published
2	EVF Tally LED	When enabled, the LED illuminates red when recording; For more information, go to "Indicator" on page 116
3	Key 1	Programmable key Magnify: Toggle
4	Key 2	Programmable key Exposure Check: Toggle
5	Eyepiece Heater	The integrated eyepiece heater automatically heats the eyepiece when the EVF detects a low ambient temperature

DSMC2 RED EVF

The DSMC2 RED EVF (OLED) is a high definition electronic viewfinder designed as the ideal single-viewer monitoring solution. Featuring the latest OLED technology, this EVF provides an unmatched personal viewing experience with a 1080p OLED micro-display, and improved color accuracy with 30-bit RGB color represenation. View and monitor your RED footage as it is intended with truer colors and deeper blacks in a larger field of view.

RED offers multiple mounting solutions for each camera type.

WARNING: DO NOT point the DSMC2 RED EVF (OLED) eyepiece at direct sunlight. Continued exposure to direct sunlight may damage the EVF. Point the eyepiece away from sunlight when not in use. Damage to the DSMC2 RED EVF (OLED) caused by continued exposure to direct sunlight is not covered under warranty.

NOTE: DO NOT overtighten the black tension ring on the EVF connector. The EVF is designed to allow rotation even when the tension ring is fully engaged.

DSMC2 RED EVF FEATURES

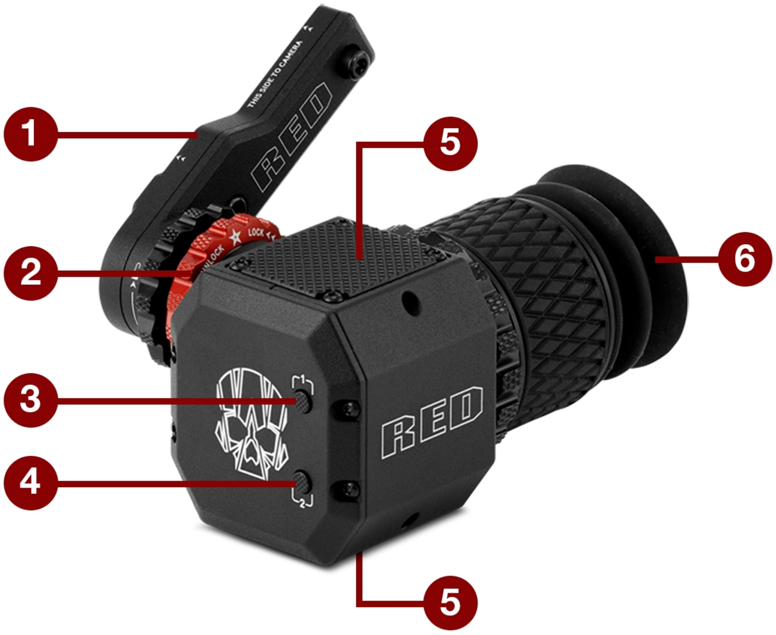


Figure: DSMC2 RED EVF

#	FEATURE	DESCRIPTION
1	DSMC2 RED EVF Mount	The DSMC2 RED EVF Mount. DO NOT overtighten the black tension ring on the EVF connector. The EVF is designed to allow rotation even when the tension ring is fully engaged.
2	EVF Connector[1]	Custom digital video and power interconnection between the EVF and other RED devices; Pinout not published; compatible with standard RED LCD/EVF cables.
3	Key 1	Programmable key Magnify: Toggle
4	Key 2	Programmable key Exposure Check: Toggle
5	Mounting Point	Mounting point for the DSMC2 RED EVF Mounting Plate
6	DSMC2 RED EVF Modular Optical Block	Fully coated with a > 32° field of view

1. Not visible. Shown with the DSMC2 RED EVF Mount attached.

LCD/EVF ADAPTORS

The LCD/EVF adaptors enable you to use legacy RED displays (which feature LCD/EVF connectors) with the RED RANGER (which features pogo LCD/EVF connectors). For more information on available displays, go to "Displays and Electronic Viewfinders" on page 24.

ITEM	PART NUMBER
DSMC2 LCD/EVF Adaptor A	720-0037
DSMC2 LCD/EVF Adaptor B	720-0038
DSMC2 LCD/EVF Adaptor D	720-0055

LCD/EVF ADAPTOR A

LEMO ADAPTOR A

Figure: DSMC2 LCD/EVF Adaptor A

The DSMC2 LCD/EVF Adaptor A makes your existing RED Touch, RED PRO, and RED PRO Touch displays, as well as RED EVFs, fully compatible with the RED RANGER. The DSMC2 LCD/EVF Adaptor A converts the pogo connection on the RED RANGER to a 16-Pin 1B LCD/EVF port. The DSMC2 LCD/EVF Adaptor A is designed to attach to the primary (top) EVF/LCD port on the RED RANGER.

When used along with the DSMC2 LCD/EVF Adaptor B, this adaptor enables you to mount a DSMC2 RED Touch LCD away from the camera—to a NOGA arm or other stable mounting point.

The DSMC2 LCD/EVF Adaptor A is compatible with the BOMB EVF, (LCOS) and (OLED) models, or later.

LCD/EVF ADAPTOR B

RED DIGITAL CINEMA
LEMO ADAPTOR
1/4-20
1/4-20
1/4-20

Figure: DSMC2 LCD/EVF Adaptor B

The DSMC2 LCD/EVF Adaptor B converts the display signal from a pogo connection to a 16-Pin 1B LCD/EVF port.

When used along with the DSMC2 LCD/EVF Adaptor A or DSMC2 LCD/EVF Adaptor D, this adaptor enables you to mount a DSMC2 RED Touch LCD away from the camera—to a NOGA arm or other stable mounting point.

DSMC2 LCD/EVF ADAPTOR D

Similar to the DSMC2 LCD/EVF Adaptor A, the DSMC2 LCD/EVF Adaptor D converts the pogo connection on the RED RANGER to a 16-Pin 1B LCD/EVF port. The DSMC2 LCD/EVF Adaptor D is designed to attach to the primary (top), or the secondary (side) EVF/LCD port on the RED RANGER.

When used along with the DSMC2 LCD/EVF Adaptor B, this adaptor enables you to mount a DSMC2 RED Touch LCD away from the camera—to a NOGA arm or other stable mounting point.

The DSMC2 LCD/EVF Adaptor D is compatible with the BOMB EVF, (LCOS) and (OLED) models, or later.

CAMERA CONTROL DEVICES

This section describes the camera control devices that offer Record Start/Stop buttons:

ITEM	PART NUMBER
DSMC2 Top Handle	720-0035
DSMC2 Outrigger Handle	720-0044

DSMC2 TOP HANDLE

Figure: DSMC2 Top Handle

Ergonomic and intuitive, the DSMC2 Top Handle was engineered entirely around the most important action for any shooter—the record button. This intelligent top handle puts a new Record Start/Stop button at your fingertips, using built-in integrated circuitry.

The DSMC2 Top Handle mounts directly to the 1/4-20 mounting points on the top of the camera. With a rubberized grip and new trigger design—the DSMC2 Top Handle offers the ideal handle and shooting method for your camera.

DSMC2 OUTRIGGER HANDLE

Figure: DSMC2 Outrigger Handle

The DSMC2 Outrigger Handle offers a low profile side handle—designed with an ergonomic molded grip and integrated Record Start/Stop button. Mounted to the Top Handle Port on your camera, the DSMC2 Outrigger Handle provides comfort and stability, as well as additional 1/4-20 mounting points for your peripheral camera components. The built-in Record button puts Start/Stop functionality right at your fingertips—so you are always ready to capture the perfect shot.

The DSMC2 Outrigger Handle is ideal for shooters who use one hand on the handle, for grip and record button access, and the other for lens adjustments or support.

LENS MOUNTS

RED recommends only using the RED RANGER Shimmed PL Mount with the RED RANGER. Other RED lens mounts are mechanically compatible, but may cause focus accuracy issues.

ITEM	PART NUMBER
RED RANGER Shimmed PL Mount	725-0046

INTERCHANGEABLE OLPFS

The camera system includes intelligent, interchangeable optical low pass filters (OLPFs). The camera automatically recognizes the OLPF type installed, eliminating the need to configure OLPF settings in the camera menu.

RED offers the following modular VV interchangeable OLPFs:

ITEM	PART NUMBER
DSMC2 Standard OLPF (VV)	790-0558
DSMC2 Skin Tone-Highlight OLPF (VV)	790-0559
DSMC2 Low Light Optimized OLPF (VV)	790-0560
DSMC2 VV H_2O OLPF	790-0601

RAILS, MOUNTS, TACTICAL GEAR, AND CABLES

RED offers a wide variety of support gear, mounting platforms, cables, accessories, and other equipment. For more information, visit the RED Store at www.red.com/store.

MAXIMUM SUPPORTED WEIGHTS

The table below lists the maximum weight each handle can support in specific configurations. Damage to handles or other components of the camera system caused by using a handle to lift more than the specified weight is not covered under warranty.

ITEM	PART NUMBER	CONFIGURATION	MAXIMUM SUPPORTED WEIGHT
DSMC2 Universal Handle	790-0523	Attached directly to the camera body	30 lbs
DSMC2 Production Top Handle	790-0657	One riser attached to a plate; handle extension attached	40 lbs
		Two risers attached to a plate; handle extension attached	80 lbs

15MM LIGHTWEIGHT ROD SUPPORT

The 15mm Lightweight Rod Supports are designed for the following types of camera setups:

- Configurations with top-mounted rods (which can support EVF mounts and top-mounted lens motors)
- Compact camera configurations in which bottom-mounted rods are not desired

CHAPTER 3:

BASIC OPERATIONS

POWER OPERATIONS

This section describes the basic power operations of the camera system.

NOTE: Lens mounts are NOT HOT SWAPPABLE, meaning you cannot remove or install these items while the camera is turned on. Before installing or removing these items, you MUST turn off the camera. Failure to do so may result in damage to the item or camera that is not covered under warranty.

WARNING: While third-party batteries may be mechanically compatible with the camera system, the manufacturer is responsible for the performance and stability of third-party options, not RED®. Damage to the camera system or third-party devices caused by using third-party power options is not covered under warranty. The camera may be unable to determine and display the voltage or remaining battery capacity of third-party power options.

POWER PRIORITY

When multiple power sources are connected to the camera, power consumption is prioritized in this sequence:

1. Any power supply connected to the DC IN port
2. Rear battery

POWER CONSUMPTION

The camera draws approximately 4.2 A (63 W) when configured with the DSMC2 RED Touch 7.0" LCD and RED MINI-MAG® 512GB.

Under typical conditions batteries provide the following operating time:

- **REDVOLT-V**: Powers the camera and accessories for approximately 24 minutes.
- **RED BRICK**: Powers the camera and accessories for approximately 96 minutes.

POWER STATUS

The power status of the current primary power source displays in the Lower Status Row of the graphical user interface (GUI). Navigate to the Power In menu at **Menu** > **Power** > **Power In** for the status of all connected power sources. For more information, go to "Power Menu" on page 84.

APPROVED EXTERNAL DC POWER

The camera accepts input voltages of 11.5 V DC to 32 V DC, and can draw a maximum current of 14A. The camera can be powered continuously by connecting one (1) of the following to the DC IN port on the camera:

- **XLR DC power source**: Use the 3-PIN XLR-TO-4-PIN 2B POWER CABLE (10') to connect the DC-IN port to third-party 24/28V output power, such as Anton Bauer VCLX or Bebob Cube 1200 batteries

TURN ON THE CAMERA

NOTE: If you have just turned off the camera, wait at least three (3) seconds before turning the camera back on.

1. Attach a power source to the camera.
2. Press and release the **PWR/REC** key on the right side of the camera.

   The Power Status LED illuminates amber as the camera turns on.

   The Power Status LED illuminates green to confirm that the camera is turned on and ready to use.

TURN OFF THE CAMERA

Use one of the following methods to turn off the camera:

- Go to **Menu** > **Power** and select **Shutdown**.
- Press and hold **PWR/REC** until the **Shutting Down...** notification shows on the display.

NOTE: The camera turns off automatically if the supply voltage drops to 11.5 V.

CONFIGURE YOUR CAMERA

This section describes common options for configuring your camera system.

DSMC2 TOP HANDLE AND DSMC2 OUTRIGGER HANDLE: INSTALL/REMOVE

INSTALL THE DSMC2 TOP HANDLE OR DSMC2 OUTRIGGER HANDLE

WARNING: Before installing or removing this item, you MUST turn off the camera.

REQUIRED TOOL(S): 3/16" hex key

1. Turn off the camera.
2. Position the DSMC2 Top Handle or DSMC2 Outrigger Handle on top of the camera, aligning the connector on the bottom of the handle with the connector on top of the camera.
3. Tighten the two (2) captive screws approximately two (2) turns each using a 3/16" hex key. DO NOT FULLY TIGHTEN.
4. Fully tighten the two (2) screws using a 3/16" hex key.

   WARNING: DO NOT OVERTIGHTEN.

REMOVE THE DSMC2 TOP HANDLE OR DSMC2 OUTRIGGER HANDLE

WARNING: Before installing or removing this item, you MUST turn off the camera.

REQUIRED TOOL(S): 3/16" hex key

1. Turn off the camera.
2. Loosen the two (2) captive screws using a 3/16" hex key.
3. Remove the DSMC2 Top Handle or DSMC2 Outrigger Handle from the camera.

INSTALL THE FOCUS HOOK SCREW

The camera comes with a screw stored in the bottom of the media bay, called the focus hook screw. You can install this screw in the Focus Hook Mounting point (along the sensor plane), and then pull focus from that location. You can either attach measuring tape directly to the screw, or you can install a hook to the screw, and attach the measuring tape to the hook.

To install the focus hook screw, follow the instructions below:

REQUIRED TOOL(S): Slotted screwdriver

1. Remove the focus hook screw from the Focus Hook Screw Storage Location on the media bay using a slotted screwdriver.

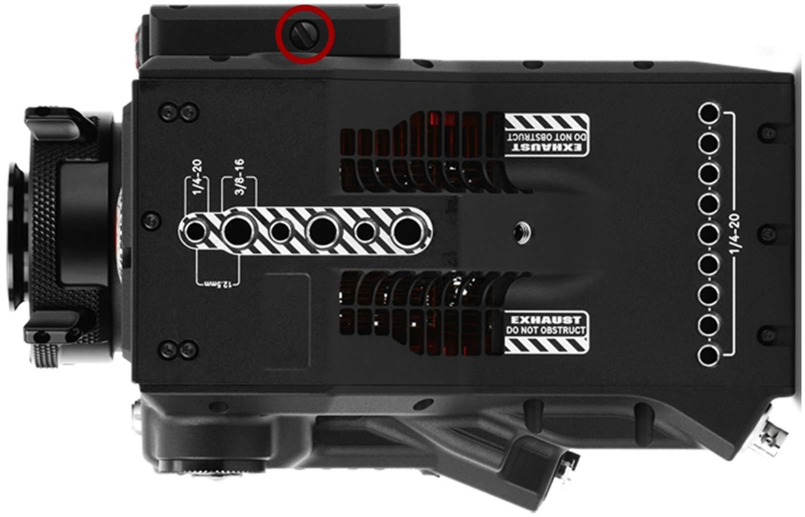

1/4-20
3/8-16
12.5mm
EXHAUST DO NOT OBSTRUCT
EXHAUST DO NOT OBSTRUCT
1/4-20

Figure: Focus Hook Screw Storage Location

2. Tighten the focus hook screw into the Focus Hook Mounting Point on the media bay using a slotted screwdriver.

   WARNING: DO NOT OVERTIGHTEN.

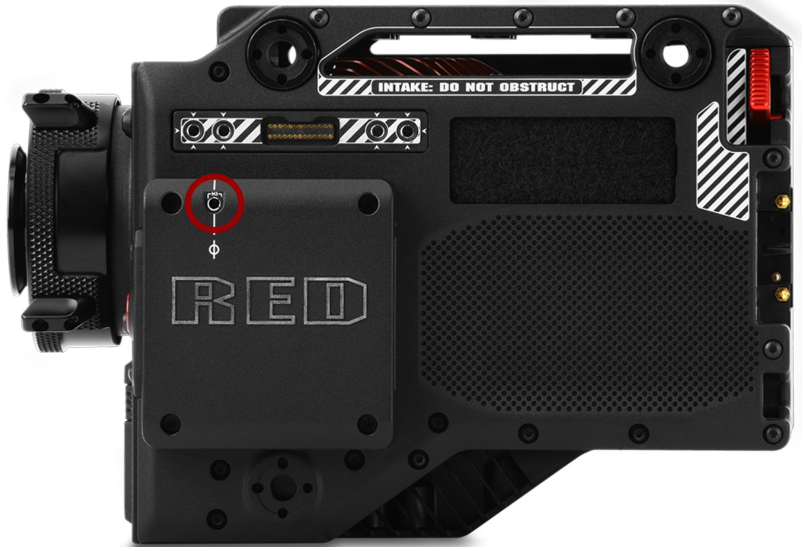

INTAKE: DO NOT OBSTRUCT
RED

Figure: Focus Hook Mounting Point

SHIM THE RED RANGER SHIMMED PL MOUNT

The RED RANGER Shimmed PL Mount is shimmed in the factory to align to the RED RANGER it is packaged with. To shim a RED RANGER Shimmed PL Mount, use a DENZ® Flange Depth Controller (FDC), or similar tool, to measure the Flange Focal Distance (FFD).

The following shims are provided with each RED RANGER PL Mount Shim Pack:

SHIM SPECIFICATIONS

PART NUMBER	MICRONS	INCHES
125-4660-001	13	.0005
125-4660-002	19	.00075
125-4660-003	25	.0010
125-4660-004	50	.0020
125-4660-005	75	.0030

SHIM OFFSET STACK TABLE

The table below shows the offsets (as measured in microns) created by using different combinations of shims. Shimming requires no more than one (1) of each size shim and no more than three (3) total shims.

OFFSET WITHOUT SHIMS	SHIM 1	SHIM 2	SHIM 3	SHIM TOTAL	OFFSET AFTER SHIMS
50	50	—	—	50	0
55	50	—	—	50	5
60	50	13	—	63	–3
65	50	13	—	63	2
70	50	19	—	69	1
75	75	—	—	75	0
80	75	—	—	75	5
85	75	13	—	88	–3
90	75	13	—	88	2
95	75	19	—	94	1
100	75	25	—	100	0
105	75	25	—	100	5
110	75	25	13	113	–3
115	75	25	13	113	2
120	75	25	19	119	1

OFFSET WITHOUT SHIMS	SHIM 1	SHIM 2	SHIM 3	SHIM TOTAL	OFFSET AFTER SHIMS
125	75	50	—	125	0
130	75	50	—	125	5
135	75	50	13	138	–3
140	75	50	13	138	2
145	75	50	19	144	1
150	75	50	25	150	0

INSTALL SHIMS

REQUIRED TOOL(S): T6 TORX screwdriver, DENZ FDC (or similar tool), LOCTITE® 222

1. Turn off the camera.
2. Use a T6 TORX driver to remove the eight (8) screws on the lock ring assembly from the PL base.
3. Remove the lock ring assembly.
4. Add or remove the correct amount of provided shims measured with the DENZ FDC to the lock ring assembly. Add the thinnest shims first, and then add the thicker ones, so that the thicker shims hold the thinner shims in place.

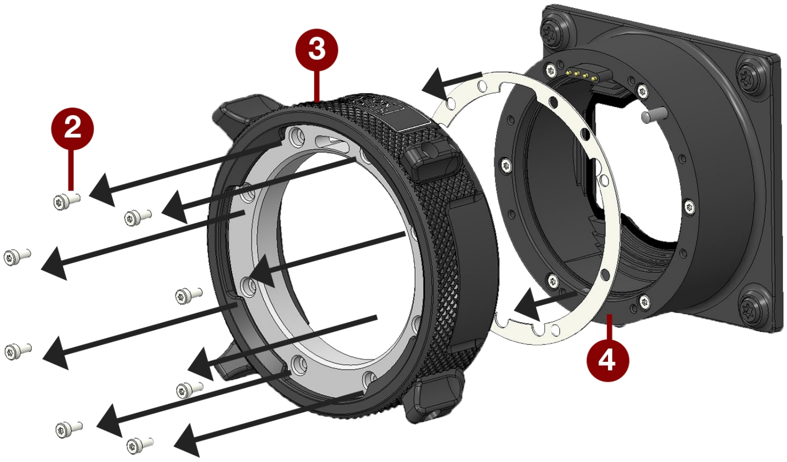


Figure: Shim Installation

5. Place the lock ring assembly back onto the PL base.
6. Place a small amount of LOCTITE 222 on each of the eight (8) leading threads.
7. Replace and loosely tighten the eight (8) M2x6 mm screws in a cross pattern ("X" pattern) using a T6 TORX driver.

   WARNING: DO NOT FULLY TIGHTEN
8. Tighten the eight (8) screws evenly in a cross pattern ("X" pattern) using a T6 TORX driver to 30 in-oz, or damage may occur.

   WARNING: DO NOT OVERTIGHTEN.

INTERCHANGEABLE OLPF SYSTEM

WARNING: Read these instructions carefully and in their entirety before removing or installing an OLPF. Damage to the OLPF module, camera, or sensor due to improper handling or use is not covered under warranty.

WARNING: Once an interchangeable OLPF is removed from the camera, the sensor is exposed. Improper handling of the OLPF modules or camera during this procedure may compromise the installation or cause irreparable damage to your camera or sensor.

WARNING: DO NOT allow any dirt or debris to enter the optical cavity.

WARNING: Use only VV OLPFs. DO NOT use other OLPFs.

SWAP AN INTERCHANGEABLE OLPF

REQUIRED TOOL(S): T20 TORX driver

1. Turn off the camera.
2. Remove any cables or accessories that may interfere with operations.
3. Loosen and remove the four (4) M4x0.7 x 8 mm lens mount screws in a cross pattern (“X” pattern) using a T20 TORX driver.

   NOTE: Some lens mounts have captive screws that are not removable.

   NOTE: Screw removal may require a large handle T20 TORX driver and additional leverage.
4. Remove the lens mount.
5. Use a damp, lint-free cloth to gently wipe down the area around the lens mount and OLPF module. Remove as much dust and debris as possible.
6. Use a T20 TORX driver to turn the OLPF lock on the camera counter-clockwise by a third turn to the Unlock position. DO NOT turn the indicator mark past the Unlock icon.

   WARNING: DO NOT OVERTIGHTEN.
7. Remove the OLPF module and place it in its protective case.
8. Use an LED light to ensure that the optical cavity is clean and free from dust or debris.
9. Ensure the new OLPF module is clean and free of debris.
10. Install the new OLPF module straight into the optical cavity, keeping the front face of the OLPF module parallel to the front of the camera.

    NOTE: Inserting the OLPF module at an angle may cause it to not seat properly.
11. Use a T20 TORX driver to turn the OLPF lock on the camera clockwise by a third turn to the Lock position. DO NOT turn the indicator mark past the Lock icon.

    WARNING: DO NOT OVERTIGHTEN.

    NOTE: If the lock does not turn easily, gently press down on the OLPF module while turning the lock.
12. Replace the lens mount.
13. Replace and loosely tighten the four (4) M4x0.7 x 8 mm lens mount screws in a cross pattern (“X” pattern) using a T20 TORX driver. DO NOT FULLY TIGHTEN.

    NOTE: Some lens mounts have captive screws that are not removable.
14. Fully tighten the four (4) lens mount screws in a cross pattern (“X” pattern) using a T20 TORX driver. DO NOT exceed 350 in-oz, or damage may occur.

    WARNING: DO NOT OVERTIGHTEN.

USE A TRIPOD OR MONOPOD

This section describes the camera mounting points and mounting equipment for use with a tripod or monopod. The camera is equipped three (3) 3/8-16 mounting holes and three (3) 1/4-20 mounting holes on the bottom of the camera. These mounting points are designed for use with a variety of mounting plates and hardware, to support tripods and other support systems.

WARNING: Ensure that the tripod, monopod, or support system is designed and rated to handle the weight of your camera configuration. RED is not responsible for any damage caused by using a tripod, monopod, mount, or support system that does not provide sufficient support.

WARNING: DO NOT use excessive force to mount a support accessory, as this may damage the screw threading.

RED offers the following products for use with tripods and other support systems:

Item	Part Number
Mounting Plate (DSMC)	790-0094
DSMC Quick Release Platform Pack	790-0183
Quick Release Platform Pack (Bolt-On)	790-0078
Quick Release Platform (Dovetail)	790-0079
Quick Release Platform (Mini)	790-0390
Dovetail Mounting Plate (Long)	790-0083
Dovetail Mounting Plate (Short)	790-0084

For more information, visit the RED store at www.red.com/store.

VIDEO MONITOR OUTPUTS

The monitoring path converts RAW sensor data to a white balanced 12-bit depth 1920 x 1080 pixel RGB 4:4:4 video signal. The signal may be modified using ISO, White Balance, or other RGB color space adjustments. The signal is then scaled and gamma-corrected to provide monitor outputs at 10-bit depth in 4:2:2 YCC or 8-bit depth in 4:4:4 RGB.

The camera offers the following monitor outputs:

- **EVF/LCD**: Supports a RED EVF or LCD display.
- **HD-SDI**: Provides a 720p or 1080p output suitable for monitoring or recording to an external VTR or DDR device. It may be configured for 10-bit LIN (VIDEO) or 10-bit LOG (FILM) encoded data.

VIDEO MONITOR CATEGORIES

Video monitor outputs are separated into three (3) categories:

- **VIEWFINDER**: The Upper Status Row, Live Action Area, and Lower Status Row display. Default output is the EVF/LCD connector located on top of the camera. If an EVF or LCD is not connected, you can transfer the VIEWFINDER output to the SDI output.
- **PROGRAM/Clean**: None of the graphic overlays display.
- **PREVIEW**: The Live Action Area and associated graphic overlays display.

For more information about changing the video monitor category of your monitor, go to "Monitor Mode" on page 70.

RECORD

Perform one of the following actions to begin recording:

- Press **PWR/REC** on the camera.
- Press **START/STOP** on the DSMC2 Top Handle or DSMC2 Outrigger Handle.
- Trigger start/stop with a compatible third-party trigger.
- Double-tap the right 25% on an attached touchscreen display (when enabled).

NOTE: To enable Double-Tap Right 25% to Record, go "Advanced" on page 73.

RECORD VIA HD-SDI

NOTE: Audio is not embedded in the MON-1 signal.

This section describes how to record via HD-SDI through simultaneous record (recording to an SSD and an external recorder at the same time) or external record only.

SIMULTANEOUS RECORD

NOTE: The secondary LCD/EVF port and a MON-1 port cannot be used at the same time. Go to "Monitor Preferences" on page 70.

You can record simultaneously to an external recorder and a RED SSD. To record simultaneously, follow the instructions below:

1. Connect the camera to an external recorder with an HD-SDI cable.
2. Ensure that a formatted SSD is inserted in the camera.
3. Set up the HD-SDI output:
    A. Go to **Menu** > **Monitoring** > **Monitors** and select a monitor.
    B. Select **Clean** from the **Mode** drop-down menu (otherwise the external recorder records the overlay).
    C. Select the output resolution from the **Resolution** drop-down menu.

    NOTE: The HD-SDI maximum resolution is 1080p. For more information, go to "Record/Monitor Out Ports" on page 195.
4. Disable all False Colors (otherwise the external recorder records the False Colors). For more information, go to "Tools" on page 75.
5. If monitoring audio via a third-party monitor that supports audio, set up the monitor mix:
    A. Go to **Menu** > **Settings** > **Audio** > **Mix** > **Monitor Mix**.
    B. Adjust the input channels.
6. Go to **Menu** > **Settings** > **Recording** > **Mode**.
7. Select **Local** from the **Storage** drop-down menu.
8. Begin recording.

EXTERNAL RECORD

NOTE: The secondary LCD/EVF port and a MON-1 port cannot be used at the same time. Go to "Monitor Preferences" on page 70.

You can record to an external recorder without recording to an SSD. To record to an external device only, follow the instructions below:

1. Connect the camera to an external recorder with an HD-SDI cable.
2. Ensure the SSD is ejected.
3. Set up the HD-SDI output:
    A. Go to **Menu** > **Monitoring** > **Monitors** and select a monitor.
    B. Select **Clean** from the **Mode** drop-down menu (otherwise the external recorder records the overlay).
    C. Select the output resolution from the **Resolution** drop-down menu.

    NOTE: The HD-SDI maximum resolution is 1080p. For more information, go to "Record/Monitor Out Ports" on page 195.
4. Disable all False Colors (otherwise the external recorder records the False Colors). For more information, go to "Tools" on page 75.
5. If monitoring audio via a third-party monitor that supports audio, set up the monitor mix:
    A. Go to **Menu** > **Settings** > **Audio** > **Mix** > **Monitor Mix**.
    B. Adjust the input channels.
6. Go to **Menu** > **Settings** > **Recording** > **Mode**.
7. Select **External** from the **Storage** drop-down menu.
8. Begin recording.

CHAPTER 4:

BASIC MENUS AND CONTROLS

GUI MENU INTRODUCTION

This section describes the structure and layout of the graphical user interface (GUI) that overlays the video monitor signal. Advanced GUI menu controls enable convenient access to menus, overlays, and other critical camera information. Functionality varies based on monitor output type and firmware version. The GUI menu is separated into three (3) main sections:

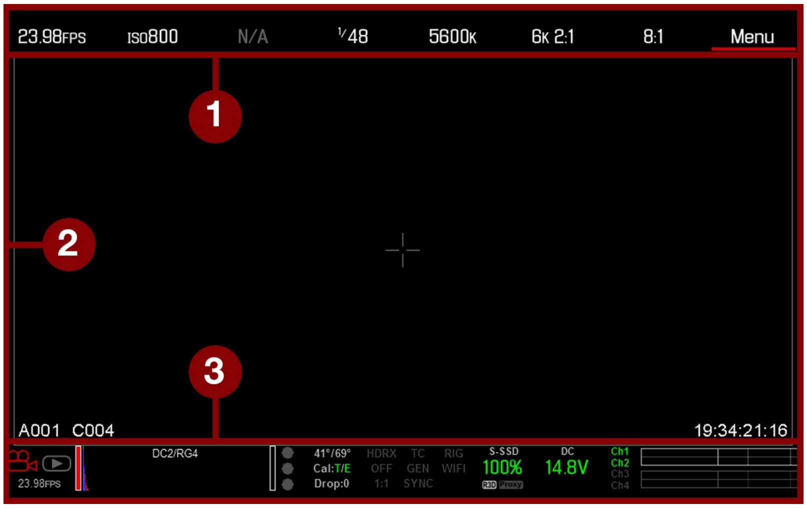

23.98FPS
ISO800
N/A
1/48
5600K
6K 2:1
8:1
Menu
1
2
3
A001 C004
19:34:21:16
23.98FPS
DC2/RG4
41°/69°
Cal:T/E
Drop:0
HDRX
OFF
1:1
TC
GEN
SYNC
RIG
WIFI
S-SSD
100%
R3D
Proxy
DC
14.8V
Ch1
Ch2
Ch3
Ch4

Figure: GUI Control Menu

#	ITEM	DESCRIPTION
1	Upper Status Row (Basic Menu)	Easy access to primary camera capture parameters. Go to "Upper Status Row (Basic Menu)" on the next page.
2	Live Action Area	Live camera recording view, overlays, guides, and more. Go to "Live Action Area" on page 48.
3	Lower Status Row	Critical camera parameters, record/playback modes, media and power status, and audio meter. Go to "Lower Status Row" on page 49.

UPPER STATUS ROW (BASIC MENU)

The Upper Status Row displays basic project parameters. The currently selected parameter in the Upper Status Row is underlined with a red bar. The Upper Status Row is also known as the Basic Menu.

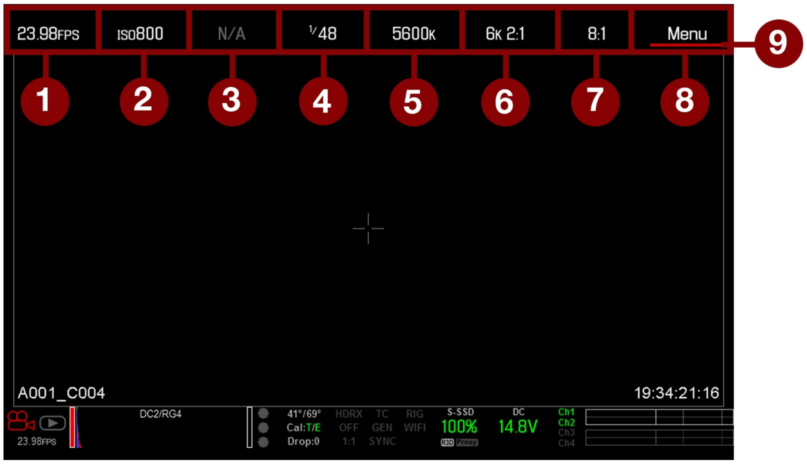

23.98FPS
ISO800
N/A
1/48
5600K
6K 2:1
8:1
Menu
1
2
3
4
5
6
7
8
9
A001_C004
19:34:21:16
23.98FPS
DC2/RG4
41°/69°
Cal:T/E
Drop:0
HDRX
OFF
1:1
TC
GEN
SYNC
RIG
WIFI
S-SSD
100%
R3D
Proxy
DC
14.8V
Ch1
Ch2
Ch3
Ch4

Figure: Upper Status Row

The Upper Status Row includes the following GUI elements:

#	ITEM	DESCRIPTION	DETAILS
1	Frame Rate (fps)	Recording frame rate	"Frame Rate" on page 95
2	ISO	Camera sensitivity	"ISO" on page 67
3	Aperture	Lens aperture (F stop) information	"Aperture" on the next page
4	Exposure (Shutter)	Integration time or shutter angle	"Exposure/Shutter" on page 96
5	Color Temperature	White balance and Tint	"White Balance" on page 65
6	Resolution	Record resolution	"Format" on page 98
7	REDCODE®	REDCODE compression setting	"REDCODE" on the next page
8	Menu	Access advanced settings	"Advanced Menus" on page 62
9	Cursor	Indicates currently selected Upper Status Row element	N/A

ACCESS ADVANCED MENUS

For every Upper Status Row item, you can select the **Advanced...** button to access the related menu in the Advanced Menus.

For example, select **Advanced...** in the Frame Rate menu to open **Menu** > **Settings** > **Project** > **Frame Rate**.

For more information about Advanced Menus, go "Advanced Menus" on page 62.

FEATURE: EDIT LIST

Select the **Edit List...** button in the Upper Status Row menus to change the values that display for each setting. For example, if you open the Frame Rate menu and select **Edit List...**, the camera lets you add or remove values.

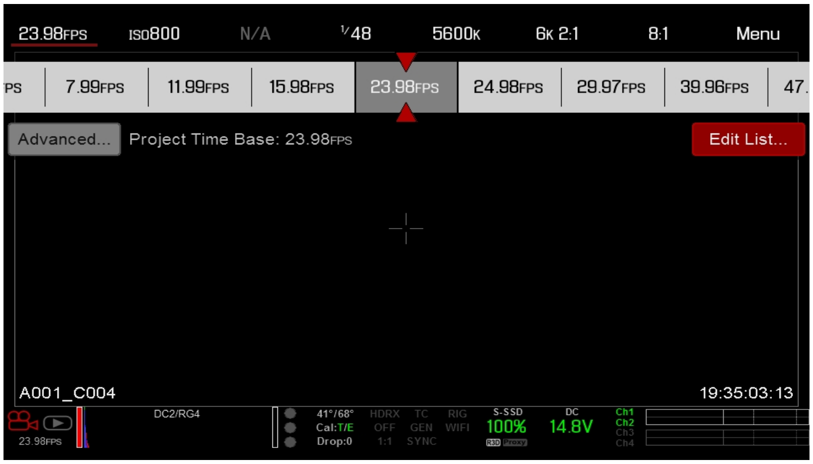

23.98FPS
ISO800
N/A
1/48
5600K
6K 2:1
8:1
Menu
7.99FPS
11.99FPS
15.98FPS
23.98FPS
24.98FPS
29.97FPS
39.96FPS
47.
Advanced...
Project Time Base: 23.98FPS
Edit List...
A001_C004
19:35:03:13
23.98FPS
DC2/RG4
41°/68°
Cal:T/E
Drop:0
HDRX OFF 1:1
TC GEN SYNC
RIG WIFI
S-SSD 100%
DC 14.8V
Ch1 Ch2 Ch3 Ch4

Figure: Select "Edit List..." Button

APERTURE

The aperture (also known as the T stop or F stop) parameter displays when a compatible mount and lens are installed. The aperture controls the depth of field of the image and, in combination with the shutter speed/angle setting, controls the amount of light that reaches the sensor (exposure).

- Increasing the aperture to a higher number increases the depth of field, but reduces the exposure (brightness).
- Decreasing the aperture to a lower number decreases the depth of field, but increases the exposure (brightness).

RED DSMC PL MOUNT INSTALLED

The current aperture of the attached lens displays when a DSMC® PL mount is installed and a supported lens equipped with Cooke® S4/i® system is attached.

Select the **Advanced...** button to access the **Menu** > **Settings** > **Setup** > **Lens** screen. For more information, go to "Lens" on page 131.

REDCODE

Select the target REDCODE compression ratio for your project.

If the camera is able to achieve the target compression ratio, the compression ratio displays in white. If the camera is unable to achieve the target compression ratio, the compression ratio displays in yellow, and the camera uses the next possible compression ratio.

The current compression ratio is automatically recalculated when changes are made to the project resolution, aspect ratio, anamorphic setting, frame rate, HDRX® mode, media, or the target REDCODE compression ratio.

The RECODE compression affects the overall quality of the footage. A lower compression (for example: 2:1) increases the quality of the footage, while a higher compression (for example: 22:1) lowers the quality.

REDCODE range is 2:1 to 22:1. Default is 8:1.

For maximum available REDCODE values, see the DSMC Media Operation Guide at www.red.com/downloads.

LIVE ACTION AREA

The Live Action Area contains the recorded image area, Look Around area, and various overlays. The color of each overlay can be customized to maximize the contrast between the guide(s) and scene being captured.

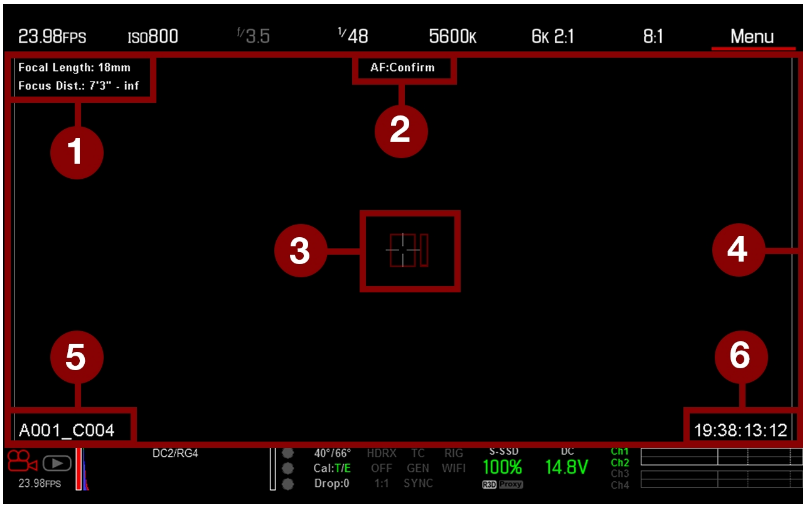

23.98FPS
ISO800
1/3.5
1/48
5600K
6K 2:1
8:1
Menu
Focal Length: 18mm
Focus Dist.: 7'3" - inf
AF:Confirm
1
2
3
4
5
6
A001_C004
19:38:13:12
23.98FPS
DC2/RG4
40°/66°
Cal:T/E
Drop:0
HDRX
OFF
1:1
TC
GEN
SYNC
RIG
WIFI
S-SSD
100%
R3D
Proxy
DC
14.8V
Ch1
Ch2
Ch3
Ch4

Figure: Live Action Area

The Live Action Area includes the following GUI elements:

#	ITEM	DESCRIPTION	DETAILS
1	Lens Information	Lens information when using supported lenses	"Lens Information" below
2	AF Status	Currently selected auto focus mode	"Focus Menu" on page 118
3	Center Crosshair and Spot Focus Guide	Crosshair: Center of selected guide Reference guides: Safe Action/Safe Title, Picture Center, Grid Overlay	"General Tab" on page 81
4	Frame Guides	Record or sensor projection area	"Guides" on page 80
5	Clip Filename	Filename of the clip being recorded, or filename of the next clip to be recorded	N/A
6	Timecode Value	Current timecode value	"Timecode" on page 149

LENS INFORMATION

This section describes the lens information displays when a supported lens is attached.

PL LENSES

Displays the focal length and focal distance when a DSMC PL mount is installed and a lens with the Cooke S4/i system (or equivalent) is attached. For more information, go to "Lens" on page 131.

LOWER STATUS ROW

The Lower Status Row provides access to key system information and camera values.

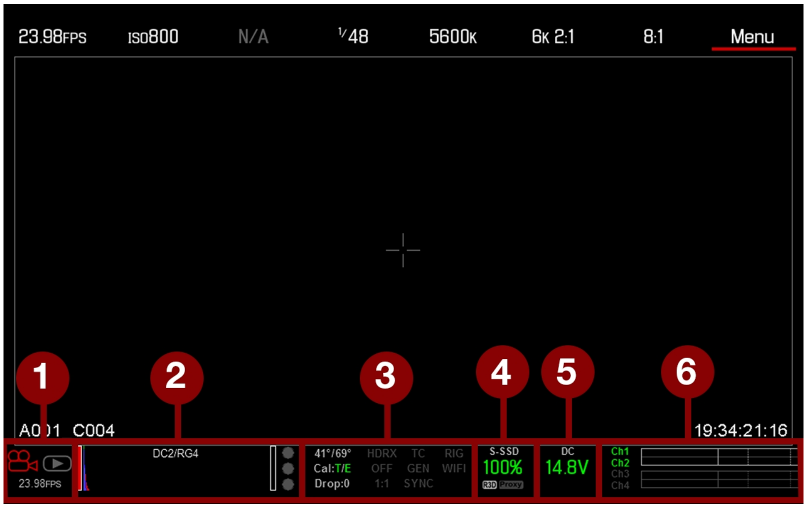

23.98FPS
ISO800
N/A
1/48
5600K
6K 2:1
8:1
Menu
1
2
3
4
5
6
A001 C004
19:34:21:16
23.98FPS
DC2/RG4
41°/69°
Cal:T/E
Drop:0
HDRX
OFF
1:1
TC
GEN
SYNC
RIG
WIFI
S-SSD
100%
R3D
Proxy
DC
14.8V
Ch1
Ch2
Ch3
Ch4

Figure: Lower Status Row

#	ITEM	SUB-ITEM/DESCRIPTION	DETAILS
1	Camera Mode	Swipe up to toggle Motion/Stills/Playback modes	"Camera Mode" on page 51
2	Histogram	Histogram; tap to open the Tools menu	"Histogram" on page 53
3	Project Status Indicators	Tap to open the Project Status menu	"Project Status" on page 135
		Camera sensor and core temperature	"Sensor Calibration" on page 138
		Cal: T/E	"CAL: T/E Indicator" on page 54
		HDRX®: Displays when HDRX mode is on	"HDRX Menu" on page 117
		False Color Mode: Displays modes	"False Color Modes" on page 75
		Magnify mode	"Display Modes: Magnify" on page 77
		Timecode	"TC Indicator" on page 54
		Genlock	"GEN Indicator" on page 54
		Sync	"SYNC Indicator" on page 54
		RM	"RM (Remote) Indicator" on page 54
		LAN	"LAN Indicator" on page 55
		RIG: Indicates 3D rig metadata is present	N/A
		WIFI: Indicates wireless connection	"WiFi Indicator" on page 55
4	Media Status	Media location and remaining capacity; tap to open the Media Menu	"Media Menu" on page 91

#	ITEM	SUB-ITEM/DESCRIPTION	DETAILS
5	Power Status	DC voltage or remaining battery capacity; tap to open the Power menu	"Power Status" on page 55
6	Audio Meter	Audio input and volume; tap to open the Audio menu	"Audio Meter (VU Meter)" on page 145

CAMERA MODE

The Camera Mode allows you to seamlessly toggle between Motion mode, Stills mode, and Playback. To select a camera mode, select the **Camera Mode** icon in the Lower Status Bar, swipe up, and select a camera mode.

NOTE: Setting adjustments made in Stills mode do not affect the settings in Motion mode, and vice versa.

You can select the following camera modes:

- "Motion Mode" below
- "Stills Mode" on the next page
- "Playback " on page 86

MOTION MODE

Motion mode optimizes your camera settings for capturing motion. This mode defaults the camera to Continuous Record. Motion mode includes the following features:

- Motion recording modes:
    - "Continuous Record" on page 105
    - "Internal Timelapse Timer" on page 105
    - "Frame Trigger" on page 106
    - "Speed Ramp Mode" on page 106
    - "REDCODE Burst" on page 107
- Swipe-Up Shortcuts
    - Camera Mode
    - False Color
    - Status
    - Media
    - Power
    - Audio
- Default Motion Preset (RED)

NOTE: For more information, go to "Swipe-Up Menu" on page 58.

STILLS MODE

Stills mode optimizes your camera settings for capturing stills. Stills mode includes the following features:

- Stills recording modes:
  - "Multi-Shot" on page 108
  - "Motion + Stills" on page 109
- Swipe-Up Shortcuts:
  - False Color
  - Status
  - Media
  - Power
  - Auto Focus
  - Auto Exposure
  - Record Mode
- Default Stills Preset (RED)

For more information, go to "Swipe-Up Menu" on page 58.

HISTOGRAM

NOTE: The sharpness setting affects the Histogram, RAW Level Bars, and RAW Clip Meter. For more information, go to "Output Sharpness" on page 74.

This section describes the elements that comprise the Histogram section in the Lower Status Row. This section of the GUI helps ensure that recorded footage is properly exposed.

Tap the Histogram in the Lower Status Row to access the Tools menu. For more information, go to "Tools" on page 75.

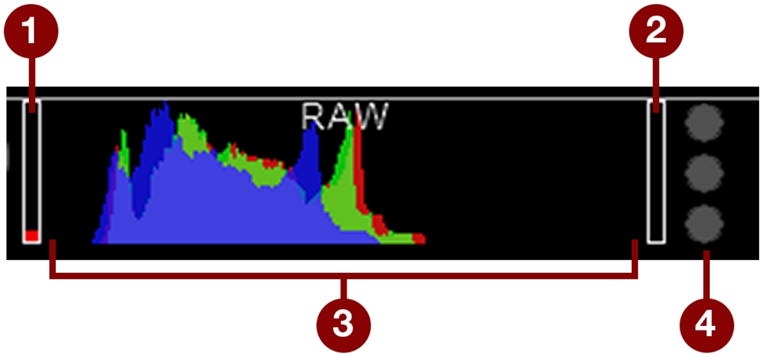


Figure: Histogram (Exposure)

#	ITEM	DESCRIPTION
1	RAW Level Bar (left)[1]	Also known as a “goal post”. Displays the amount of pixels in the image that are underexposed (noise)
2	RAW Level Bar (right)[1]	Also known as a “goal post”. Displays the amount of pixels in the image that are overexposed (clipping)
3	RGB Histogram	Provides a visual representation of exposure and sensor data levels for red, green, and blue channels; meter is affected by White Balance, ISO, and VIEW/LOOK settings
4	RAW Clip Meter	Also known as “traffic lights”. Provides a visual representation of exposure and sensor data levels for red, green, and blue channels; Circles (traffic lights) will light up when clipping occurs

1. The RAW Level Bars represent 1/4 of the total pixels in the image, and illustrate the number of pixels that are noisy or clipped in relation to the total number of pixels. For example, if the left RAW Level Bar is 1/8 of the total height, that means that approximately 1/32 of the total pixels in the total image are at an exposure level that is at risk of displaying noise when pushed to higher ISO or FLUT® values in post production.

PROJECT STATUS INDICATORS

This section describes the colors and behavior of the Project Status indicators in the Lower Status Row. Tap the Project Status indicators in the Lower Status Row to access the Project Status menu. For more information, go to "Project Status" on page 135.

CAL: T/E INDICATOR

The CAL: T/E indicator shows changes to temperature (T) or exposure (E) in relation to the active calibration map. If the temperature or exposure change significantly, calibrate the sensor at the desired temperature and exposure. Failure to properly calibrate the sensor may reduce image quality.

- **Green**: Sensor temperature or exposure are properly calibrated for current settings.
- **Yellow**: Slight change in sensor temperature or exposure.
- **Red**: Significant change in sensor temperature or exposure.
- The – and + indicate whether the sensor temperature or exposure has decreased or increased, respectively.

NOTE: T and E indicators change colors independently of each other.

TC INDICATOR

The TC indicator shows the current timecode status.

- **Grey**: No analog timecode is detected.
- **Red**: Analog timecode is detected but not enabled.
- **Green**: Analog timecode is used to jam the time of day timecode.

For more information, go to "Timecode, Genlock, Multi-Camera Setup" on page 149.

GEN INDICATOR

The GEN indicator shows the current genlock status.

- **Grey**: No genlock signal is detected, or the signal cannot cross-lock to project (24.00 fps vs. 23.98 fps).
- **Red**: During process of sync, or genlock is lost while recording.
- **Green**: A genlock signal matching the current HD-SDI monitor rate is locked.
- **Yellow**: Timing is cross-locked to compatible but not matching monitor rate. For example, genlock is 24.00 fps, and HD-SDI monitor rate is 25.00 fps.

NOTE: When the GEN indicator is yellow, DO NOT perform 3D operation. This warns that genlock source settings and camera settings are not aligned, so phasing of the sync between cameras is not guaranteed.

For more information, go to "Timecode, Genlock, Multi-Camera Setup" on page 149.

SYNC INDICATOR

The SYNC indicator shows the current sensor sync status, based on genlock.

- **Grey**: The sensor sync mode is not set to genlock.
- **Red**: The sensor sync mode is set to genlock, but is not locked to a genlock signal. This may occur if genlock or sensor sync is lost while recording.
- **Green**: The sensor sync mode and HD-SDI monitor rate are locked to a compatible genlock signal.

For more information, go to "Timecode, Genlock, Multi-Camera Setup" on page 149.

RM (REMOTE) INDICATOR

The RM indicator displays if the camera is linked to a third-party remote application, such as foolcontrol.

LAN INDICATOR

The LAN indicator shows the current status of an external LAN connection through the Gig-E port.

- **Grey**: External control of the camera is not enabled.
- **Green**: Ethernet is enabled.

WIFI INDICATOR

The WiFi indicator shows the wireless connectivity status.

- **Grey**: Wireless is disabled.
- **Yellow**: Wireless is not connected.
- **Green**: Wireless is enabled.

For more information, go to "Wireless Connection" on page 124.

POWER STATUS

The Power Status element displays the current supply voltage or remaining battery capacity. Tap the Power Status element to access the Power menu. For more information, go to "Power Menu" on page 84.

DC IN SUPPLY VOLTAGE

When powering the camera via DC power, the current voltage displays. When powering the camera using batteries, the remaining battery capacity displays. The remaining capacity is indicated by the following colors:

- **Green**: 12.0 V and up
- **Yellow**: 11.8 V to 11.9 V
- **Red**: 11.6 V to 11.7 V

NOTE: The camera turns off automatically if the supply voltage drops to 11.5 V.

When using a RED battery, the power status displays the location of the power source and the remaining battery capacity. When using a RED BRICK battery connected to DC IN, the power status displays BRICK and the remaining battery capacity.

The color of the displayed battery capacity represents the amount of time remaining:

- **Green**: >10 minutes
- **Yellow**: 5 to 10 minutes
- **Red**: <5 minutes

NAVIGATION CONTROLS

This section describes basic controls for navigating the camera menus.

TOUCHSCREEN NAVIGATION

You can control certain settings and navigate the camera menu using buttons and gestures on the RED Touch displays.

RED TOUCH DISPLAY BUTTONS

RED Touch displays offer intuitive menu control and four (4) programmable buttons.

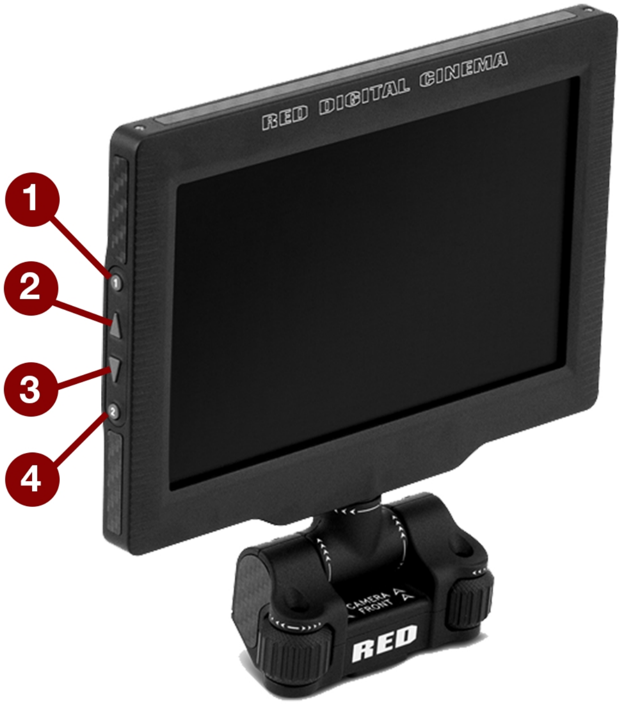


Figure: DSMC2 RED Touch 7.0" LCD

#	RED TOUCH BUTTON	DESCRIPTION
1	User Key 1	Magnify: Toggle
2	Up Button	Increase display brightness
3	Down Button	Decrease display brightness
4	User Key 2	Toggle Exposure Mode on/off

NOTE: RED Touch display keys are programmable. For more information, go to "Key Mapping" on page 122.

RED TOUCH DISPLAY GESTURES

Navigate the menus using a touchscreen by using the following gestures:

- **Tap**: Tap has many functions:
  - Tap to select a Basic Menu, submenu, or button.
  - If a menu is open, tap anywhere outside the menu to save any changes and close the menu.
  - Tap the right or left regions of the touchscreen to access the programmable soft keys.
- **Swipe**: Swipe to select different values in spinners or drop-down menus. For more information, go to "Swipe-Up Menu" on the next page.
- **Double-Tap**: If the monitor is in Clean mode, changes to Overlay mode.
- **Hold**: Tap and hold an icon to bring up an advanced interface display.
- **Pinch**: Move two (2) fingers apart/together to increase/decrease the size of the image. By default, this gesture is disabled.

SWIPE-UP MENU

The Swipe-Up Menu is available in the Lower Status Row on RED Touch displays and provides Swipe-Up Shortcuts for Motion mode, Stills mode, and Playback. For example, select the **Camera Mode** icon in the Lower Status Bar, swipe up, and select a **Camera Mode**. For more information about Stills mode and Motion mode, go to "Camera Mode" on page 51.

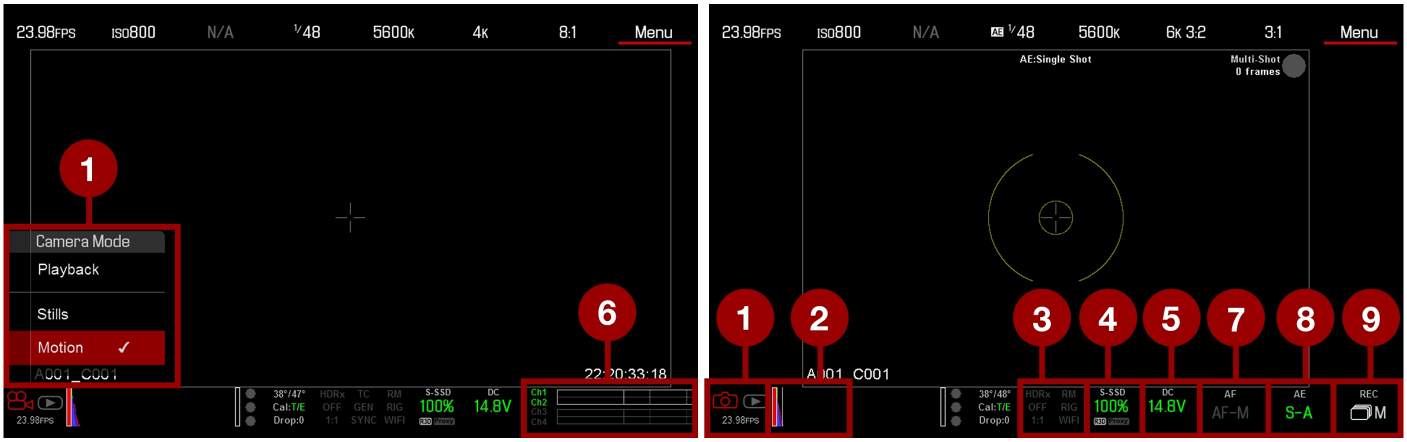

23.98FPS
ISO800
N/A
1/48
5600K
4K
8:1
Menu
1
Camera Mode
Playback
Stills
Motion ✓
A001_C001
6
22:20:33:18
S-SSD
100%
DC
14.8V
Ch1
Ch2
Ch3
Ch4
23.98FPS
ISO800
N/A
1/48
5600K
6K 3:2
3:1
Menu
AE:Single Shot
Multi-Shot
0 frames
1
2
3
4
5
7
8
9
A001_C001
S-SSD
100%
DC
14.8V
AF
AF-M
AE
S-A
REC
M

Figure: Swipe Up Menu

#	SWIPE-UP SHORTCUT	DESCRIPTION	MODE
1	Camera Mode	Select Playback, Motion, or Stills	Motion, Stills
2	False Color	Select a false color mode; go to "False Color Modes" on page 75	Motion, Stills
3	Status	View detailed status information	Motion, Stills
4	Media	View as Percentage or Time Remaining, eject media, view clip thumbnails	Motion, Stills
5	Power	View as Percentage, Time Remaining, or Voltage	Motion, Stills
6	Audio	Select Audio settings	Motion
7	Auto Focus	Set Zone, Size, and Mode	Stills
8	Auto Exposure	Set Exp Comp, Speed, Metering, Priority, and Mode	Stills
9	Record Mode	Select Multi-Shot or Motion + Stills	Stills

SIDE LCD AND NAVIGATION

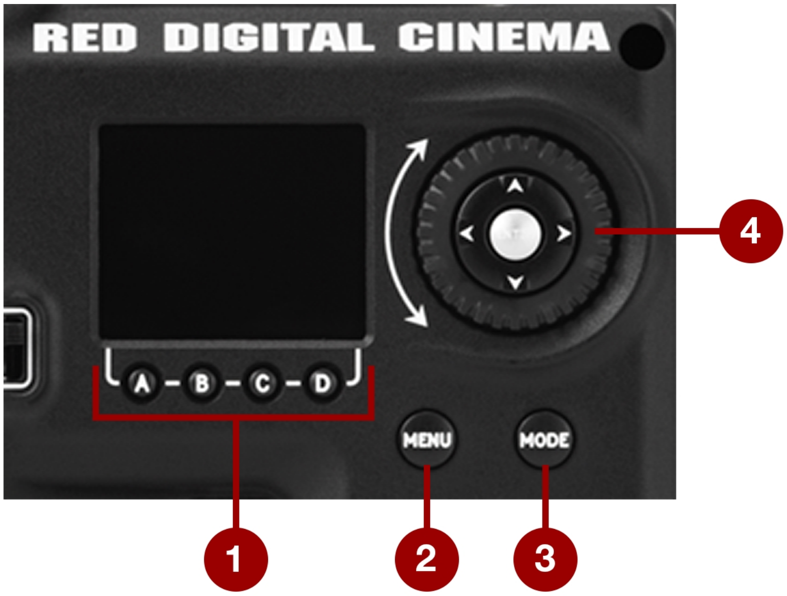


Figure: Side LCD and Navigation

#	CONTROL/ITEM	DESCRIPTION
1	User Keys (A–D)[1]	**A**: Cycle Auto-Focus Mode **B**: Auto White Balance **C**: Toggle: Magnify **D**: Toggle Exposure Mode **A + D**: Lock/unlock side buttons to prevent inadvertent menu changes
2	MENU Button	Access menus or exit currently selected menu
3	MODE Button	Toggle between Remote and Local Modes
4	Navigation Group	Navigate menus and menu items; Go to "Navigation Group" on the next page

[1] Press User Keys A + D simultaneously to lock/unlock Side LCD buttons to prevent inadvertent menu changes.

NAVIGATION GROUP

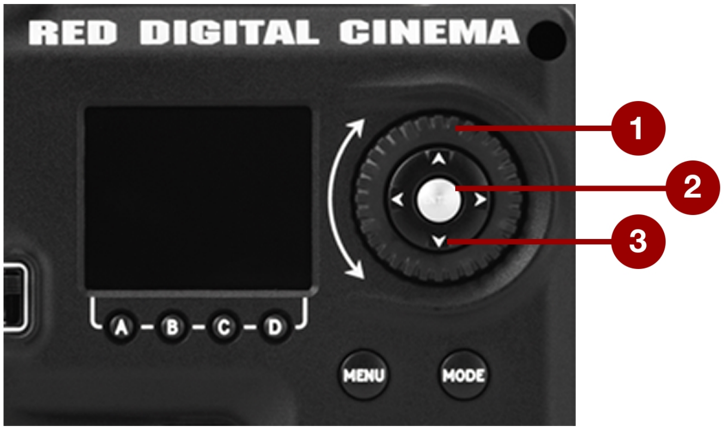


Figure: Navigation Group

#	NAVIGATION GROUP ELEMENT	DESCRIPTION
1	Scroll Wheel	Select and adjust the value of a selected setting
2	ENTER key	Press **ENTER** to confirm a setting or access the selected menu
3	Directional Keys	Navigate menus and menu items

Navigate the menus using the following controls:

- Press **ENTER** to open the menu, then rotate the **Scroll Wheel** clockwise to move right, counterclockwise to move left to highlight the desired menu or parameter. Press **ENTER** to select.
- Press the **Up Directional Key** to open the related Advanced Settings menu, if one (1) is available.

OPERATION MODES

The Side LCD display reflects the currently selected mode. Use the **Scroll Wheel** and **Directional Keys** to navigate menus. Press **MENU** to access the Advanced Menu.

Press **MODE** to toggle between the following modes:

- **Remote Mode**: Navigate with the Side LCD controls, using an attached LCD, EVF, or other monitor as a reference. The Side LCD displays the primary control screen.
- **Local Mode**: Navigate using the Side LCD controls and display. User Keys A-D are inactive.

KEY LOCK/UNLOCK

Lock the keys on the Side LCD to prevent inadvertent button presses and menu changes.

- **Lock**: Press **A** + **D** simultaneously.
- **Unlock**: Press **A** + **D** simultaneously. Alternatively, press and hold **ENTER** while keys are locked.

SIDE LCD DISPLAY

The Side LCD display provides basic camera parameters during operation.

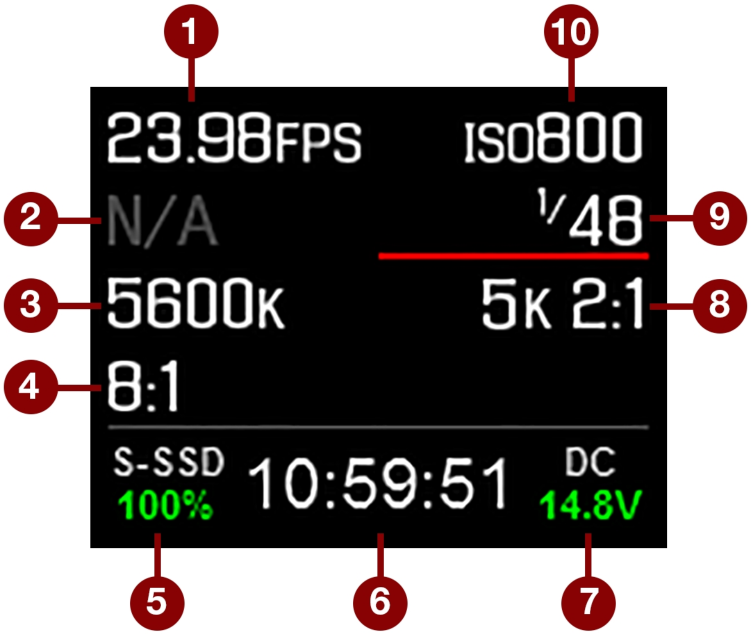


Figure: Side LCD (Local Mode)

The Side LCD displays the following camera parameters:

#	ITEM	DESCRIPTION
1	Frame Rate	Current Recording Frame Rate
2	Lens Information	Displays aperture if a supported Cooke lens is attached
3	White Balance	Color temperature
4	REDCODE	REDCODE compression setting
5	Media Status	Displays media location and remaining media capacity
6	Timecode	Current timecode value
7	Power Status	DC supply voltage or % of remaining battery capacity
8	Resolution	Recording resolution
9	Shutter Speed	Integration time or shutter angle
10	ISO	Camera sensor sensitivity

CHAPTER 5:

ADVANCED MENUS

ACCESS THE ADVANCED MENUS

To access the Advanced menus, perform one of the following:

- Tap the **Menu** button on the side of the camera.
- Tap the **Menu** icon on the touchscreen.
- Open any menu in the Upper Status Row, and then select the **Advanced...** button.

NOTE: Some menus are only available if certain hardware is present.

IMAGE MENU

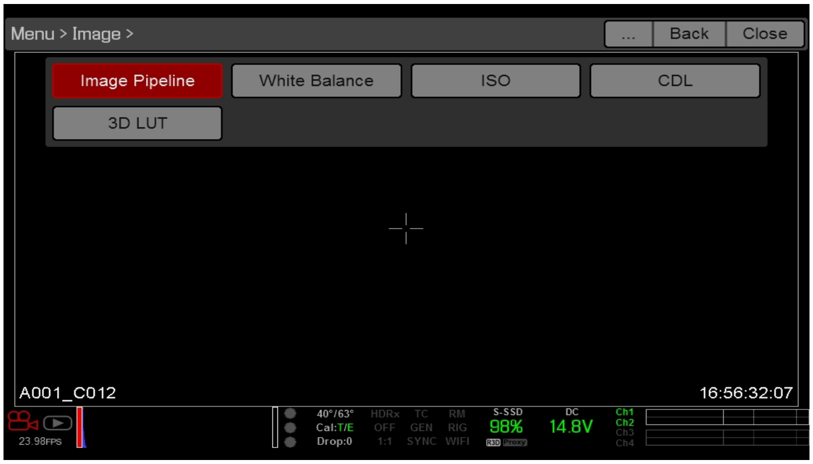

Menu > Image >
...
Back
Close
Image Pipeline
White Balance
ISO
CDL
3D LUT
A001_C012
16:56:32:07
23.98FPS
40°/63°
Cal:T/E
Drop:0
HDRx
OFF
1:1
TC
GEN
SYNC
RM
RIG
WIFI
S-SSD
98%
R3D
Proxy
DC
14.8V
Ch1
Ch2
Ch3
Ch4

Figure: Image Menu

The Image menu includes tools that control how the image appears, including Color Space and Gamma Curve.

IMAGE PIPELINE

To set up the image pipeline, go to **Menu** > **Image** > **Image Pipeline**.

IMAGE PIPELINE MODE OPTIONS

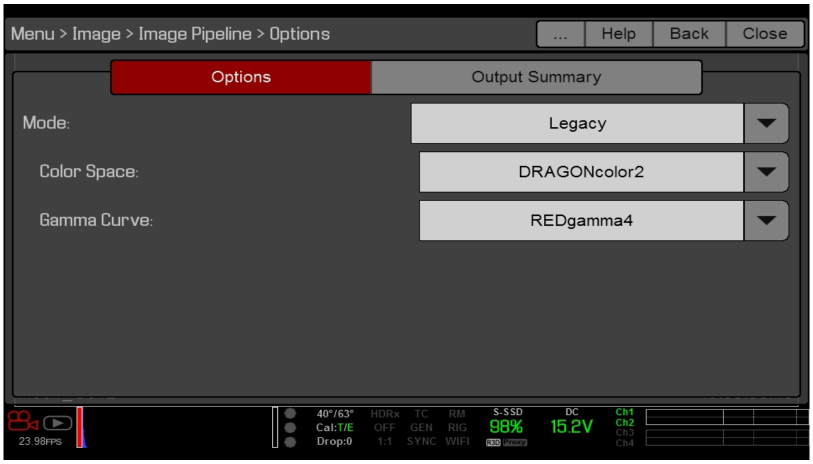
The camera offers two (2) different ways to process your image. Each mode changes which sub-menus are available in the Image menu.

- **Legacy**: In Legacy mode, the camera provides the same color options that firmware v6.3 did. Enables the Color, Gain, Curves, and LGG menus.
- **IPP2**: Image Processing Pipeline 2 (IPP2) is the new image processing pipeline, which is available starting with firmware v6.4. In IPP2, the camera applies REDWideGamutRGB, which is a color space designed to encompass all colors a RED camera can generate without clipping. The camera then encodes the image using Log3G10, a gamma curve that prevents clipping. Using this color space and gamma curve allows you to grade and make color adjustments in post production, instead of in-camera. Selecting IPP2 enables the CDL menu, and hides the Color, Gain, Curves, and LGG menus (since those are used for grading).

LEGACY MODE

To use Legacy mode, follow the instructions below:

1. Go to **Menu** > **Image** > **Image Pipeline** > **Options**.
2. Select **Legacy** from the **Mode** drop-down menu.
3. Select **OK**.



Menu > Image > Image Pipeline > Options

Mode: Legacy

Color Space: DRAGONcolor2

Gamma Curve: REDgamma4

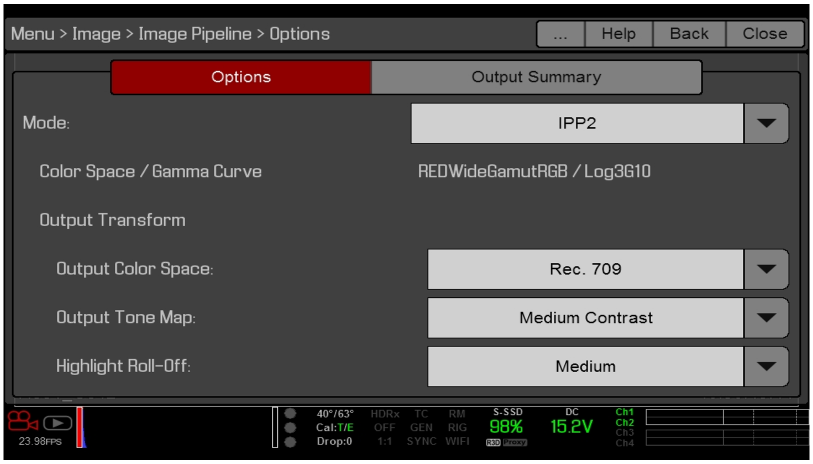
Figure: Legacy Mode

4. Select a color space from the **Color Space** drop-down menu.
5. Select a gamma curve from the **Gamma Curve** drop-down menu.
6. If you want to apply a 3D LUT, go to "3D LUT" on page 69.

IPP2 MODE

To use IPP2 mode, follow the instructions below:

1. Go to **Menu** > **Image** > **Image Pipeline** > **Options**.
2. Select **IPP2** from the **Mode** drop-down menu. With IPP2, the Color Space and Gamma Curve are always REDWideGamutRGB and Log3G10, respectively.
3. Select **OK**.


Menu > Image > Image Pipeline > Options
...
Help
Back
Close
Options
Output Summary
23.98FPS
40°/63°
Cal:T/E
Drop:0
HDRx
OFF
1:1
TC
GEN
SYNC
RM
RIG
WIFI
S-SSD
98%
R3D
Proxy
DC
15.2V
Ch1
Ch2
Ch3
Ch4

Mode: IPP2

Color Space / Gamma Curve REDWideGamutRGB / Log3G10

Output Transform

Output Color Space: Rec. 709

Output Tone Map: Medium Contrast

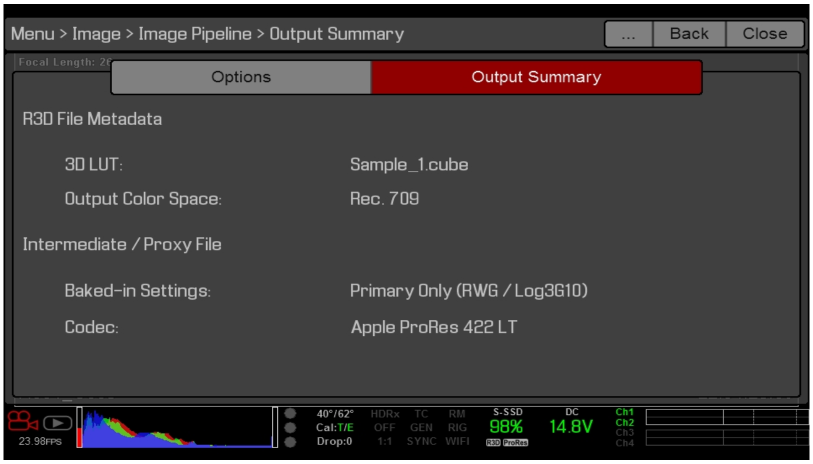
Highlight Roll-Off: Medium

Figure: IPP2 Mode

4. If you want to apply a 3D LUT, go to "3D LUT" on page 69.
5. Select a color space from the **Output Color Space** drop-down menu.
6. Select a contrast setting from the **Output Tone Map** drop-down menu.
7. Select a highlight option from the **Highlight Roll-Off** drop-down menu.

OUTPUT SUMMARY

The Output Summary menu is an information-only menu that displays what image information is applied to the R3D files and proxy files. To view the output summary, go to **Menu** > **Image** > **Image Pipeline** > **Output Summary**.



R3D File Metadata

3D LUT: Sample_1.cube

Output Color Space: Rec. 709

Intermediate / Proxy File

Baked-in Settings: Primary Only (RWG / Log3G10)

Codec: Apple ProRes 422 LT

Figure: Image Menu

R3D FILE METADATA

- **N/A** : Displays if the camera is not set to record R3D files. To enable/disable recording to R3D, go to "Select Record File Format" on page 114.
- **3D LUT**: The name of the 3D LUT applied to the file. If no LUT is applied, the screen displays [NONE].
- **Output Color Space**: Applicable to IPP2 mode only. The name of the output color space selected on the Options tab.

INTERMEDIATE / PROXY FILE

- **N/A**: Displays if the camera is not set to record Apple® ProRes files or Avid DNxHD/HR files. To enable/disable recording to these files, go to "Select Record File Format" on page 114.
- **Color Space / Gamma Curve**: Applicable to Legacy mode only. The color space and gamma curve applied to the file.
- **Baked-in Settings**: Applicable to IPP2 mode only. The image settings that are irreversibly encoded (baked) into the recorded file. To select these settings, go to "Select Record File Format" on page 114.
- **Codec**: The selected codec. To select a codec, go to "Select Record File Format" on page 114.

WHITE BALANCE

Select a color temperature. The range is 1700 to 10,000 KELVIN, and the default is 5600 KELVIN.

TINT

Color temperature calculations assume a pure light source that may not be true in the specific scene the camera is imaging. To compensate for any residual colorcast, the Tint parameter adjusts the RGB color balance with a compensating magenta-green color component. Tint range is –100 to 100, with a default of 0.000.

The Tint value displays as a rounded number in the Upper Status Row.

NOTE: Selecting Auto White Balance calculates a new Tint value. The value does not change if you adjust the color temperature manually. Selecting a preset resets the Tint to 0.000.

PRESETS

Each preset has 0.000 Tint. Available preset options are:

- **Incandescent**: 2800 K
- **Tungsten**: 3200 K
- **Fluorescent**: 4500 K
- **Flash**: 5500 K
- **Daylight**: 5600 K
- **Cloudy**: 7500 K
- **Shade**: 9000 K

AUTO WHITE BALANCE

Auto white balance analyzes the central 25% of the image visible in the monitor to calculate a color temperature that will render a white object as white.

To use auto white balance, follow the instructions below:

1. Place a white or grey object under the ambient light.
2. Go to **Menu** > **Image** > **White Balance**.
3. Select **Auto White Balance**.

ISO MENU

To select an ISO setting, go to **Menu** > **Image** > **ISO**.

ISO

NOTE: To see the full range of ISO ratings, select **ISO** in the Upper Status Row, select **Edit List**, and select **Custom**.

Select the camera ISO rating. The sensitivity value increments in 1/3 stops. When the ISO rating is adjusted, the camera logs the change as metadata and the monitor path reacts accordingly. Higher ISO values lead to brighter images in the monitor path, and vice versa.

RED recommends setting the ISO to the default, then adjusting the aperture, lighting, and ND filters to match. The ISO can later be adjusted around one (1) stop for fine-tuning.

Range is ISO 250 to 12,800. Default is ISO 800.

FLUT

NOTE: This feature is only available in Legacy mode. For more information, go to "Image Pipeline" on page 63.

Floating Point Lookup Table (FLUT) is an exposure control exclusive to RED. FLUT works like a traditional ISO setting, but can be fine-tuned in post production to any level of exposure precision. FLUT automatically protects highlights and shadows, even when changed substantially.

The FLUT setting is expressed in terms of relative exposure value (EV), where each unit represents a 1-stop change in midtone exposure level. Range is –8.0 to 8.0. Default is 0.0.

SHADOW

NOTE: This feature is only available in Legacy mode. For more information, go to "Image Pipeline" on page 63.

Shadow adjusts the toe value of the FLUT (the tone near black). Increasing the Shadow value raises the video level of near blacks. Lowering the Shadow value crushes the video level of near blacks. Range is –2.0 to 2.0. Default is 0.0.

EXPOSURE ADJUST

NOTE: This feature is only available in IPP2 mode. For more information, go to "Image Pipeline" on page 63.

Exposure Adjust (called FLUT in firmware v6.3 and earlier) works like a traditional ISO setting, but can be fine-tuned in post production to any level of exposure precision. Exposure Adjust automatically protects highlights and shadows, even when changed substantially.

The Exposure Adjust setting is expressed in terms of relative exposure value (EV), where each unit represents a 1-stop change in midtone exposure level. Range is –8.0 to 8.0. Default is 0.0.

ISO CALIBRATION

RED cameras with HELIUM®, MONSTRO®, and GEMINI® sensors have an ISO calibration that better matches a light meter and improves overall exposure quality. RED cameras with HELIUM, MONSTRO, and GEMINI sensors therefore depict a one stop brighter image compared to prior sensors (when set to an otherwise identical ISO, T-stop, and shutter speed). ISO 400 now appears as bright as ISO 800 did before, for example.

To match exposure between cameras with HELIUM, MONSTRO, and GEMINI sensors and RED cameras that DO NOT have those sensors, either reduce your camera's ISO speed by 1 stop compared to the other camera, or deselect the **Menu** > **Image** > **ISO** > **Use updated ISO calibration** check box.

As usual, RED recommends using ISO 800 as a starting point for exposure, then adjusting the T-stop and lighting or ND filters to match.

CDL

NOTE: This menu is only available in IPP2 mode. For more information, go to "Image Pipeline" on page 63.

American Society of Cinematographers Color Decision List (ASC CDL) controls are a standardized, camera-agnostic way to adjust the look of your images. Color corrections made with a device can therefore be applied or modified by other devices, even if such devices are from different manufacturers and use different standards.

Use the CDL menu to set up:

- Slope
- Power
- Offset
- Saturation

MANAGE CDLS

Use the CDLs menu to apply and import/export CDLs.

CDLs can be stored on the camera or transferred to SSD to be shared with other cameras. When exporting CDLs from camera to an SSD, the CDLs are saved to a folder on the SSD called “cdls”. When importing CDLs from an SSD to camera, the CDLs must be stored on the SSD in a folder called “cdls”.

- **Apply**: Apply the selected CDL.
- **Create**: Create a new CDL using the current settings.
- **Delete**: Delete the selected CDL.
- ➡ : Export selected CDL from camera to SSD.
- ➡**All**: Export all CDLs from camera to SSD.
- ⬅ : Import selected CDL from SSD to camera.
- ⬅**All**: Import all CDLs from SSD to camera.

COLOR

NOTE: This menu is only available in Legacy mode. For more information, go to "Image Pipeline" on page 63.

- **Saturation**: Adjusts color saturation. Range is 0.0 (monochrome) to 4.0 (super color). Default is 1.0.
- **Contrast**: Adjusts the overall contrast of the image. Range is –1.0 (flat) to 1.0 (max contrast). Default is 0.0.
- **Brightness**: Adjusts brightness without crushing highlights. Available range is –10.0 to 10.0. Default is 0.0.
- **Exp Comp**: Adjusts exposure compensation. Available range is –7.0 to 7.0. Default is 0.0.

GAIN

NOTE: This menu is only available in Legacy mode. For more information, go to "Image Pipeline" on page 63.

Adjust the red channel, blue channel, and green channel individually. The range for each is 0.0 (none of the color) to 10.0, and the default for each is 1.0.

CURVES

NOTE: This menu is only available in Legacy mode. For more information, go to "Image Pipeline" on page 63.

Define the individual curves for the luma, red, green, and blue channels. You can only adjust one (1) curve at a time. Select **Reset Curve** to reset a curve.

LGG (LIFT, GAMMA, GAIN)

NOTE: This menu is only available in Legacy mode. For more information, go to "Image Pipeline" on page 63.

Adjust the lift, gamma, and gain for the red channel, blue channel, and green channel individually.

3D LUT

Use the 3D LUT menu to apply and manage LUTs.

SELECT LUT

If you are recording to a 2K Apple ProRes or 2K Avid DNxHD/HR codec while the camera is in IPP2 mode, you can chose to irreversibly encode (bake) the 3D LUT into the recorded file. For more information, go to "Select Record File Format" on page 114.

When you apply a 3D LUT to a monitor, the name of the 3D LUT displays in the lower left corner of the Live Action area for that monitor. The Display Preset feature controls which Color Space / Gamma Curve pairing and/or 3D LUT is applied to the monitor. For more information, go to "Display Preset" on page 71.

NOTE: The 3D LUT indicator is part of the default "Standard (RED)" overlay, which you can override by selecting or creating a different overlay. For more information, go to "Custom Overlays" on page 82.

To apply a 3D LUT, follow the instructions below:

1. Go to **Menu** > **Image** > **3D LUT**.
2. Select a LUT from the **Creative 3D LUT** drop-down menu.
3. Select **OK**.

EXPORT/IMPORT LUTS

To export and import 3D LUTs, go to **Menu** > **Image** > **3DLUT** > **Import/Export**.

3D LUTs can be stored on the camera or transferred to SSD to be shared with other cameras. When exporting 3D LUTs from camera to an SSD, the 3D LUTs are saved to a folder on the SSD called “luts”. When importing 3D LUTs from an SSD to camera, the 3D LUTs must be stored on the SSD in a folder called “luts”.

- ➡ : Export selected 3D LUT from camera to SSD.
- ➡**All**: Export all 3D LUTs from camera to SSD.
- ⬅ : Import selected 3D LUT from SSD to camera.
- ⬅**All**: Import all 3D LUTs from SSD to camera.

MONITORING MENU

The Monitoring menu includes tools that control different monitor outputs, Look Around, and overlays.

MONITORS

To set up monitor preferences, go to **Menu** > **Monitoring** > **Monitors** and select the monitor whose preferences you want to change. You can set up preferences for each of the following monitors:

- LCD Top
- EVF Top
- LCD Left
- EVF Left
- MON-1
- SDI-1/2

To see what monitor preferences are available, go to "Monitor Preferences" below.

MONITOR PREFERENCES

Set up the preferences for the selected monitor. Some options are only available with specific monitors.

NOTE: While some changes take effect immediately, others take effect when you close the menu.

LCD/EVF LEFT / MON-1 SELECT

NOTE: This setting is available for LCD Left, EVF Left, and MON-1.

Select to enable either the secondary LCD/EVF port on the camera or the MON-1 port. The secondary LCD/EVF port and the MON-1 port cannot be used at the same time.

MONITOR MODE

Select an option for the **Mode** setting, which determines the elements displayed on the monitor:

- **Clean**: Only the video displays. The Upper Status Row, Lower Status Row, and overlays do not display.
- **Overlay**: The overlay displays. Overlays include the Upper Status Row and the Lower Status Row.
- **Mirror**: The monitor mirrors another screen at the same resolution. You cannot mirror a screen that is set to Clean. The Mirror option is available based on the settings of the other attached monitors, and includes the name of the monitor that can be mirrored.

NOTE: You can set a maximum of four (4) monitors to Overlay at a time. To assign additional monitors to Overlay, mirror a monitor with the same resolution that is set to Overlay.

NOTE: When two (2) touchscreens are attached to the camera with the same resolution and one (1) is currently the control surface, set the other to mirror it and give the effect of having two (2) control surfaces.

OVERLAY

Select which overlay shows on top of the video. RED® provides preset overlays, which have “(RED)” in the overlay name. Create custom overlays in the Overlay tab. For more information, go to "Custom Overlays" on page 82.

RESOLUTION

Select the output resolution for monitors (you cannot select a resolution for LCDs and EVFs, since the resolution is determined automatically). For more information about available HD-SDI resolutions, go to "Record/Monitor Out Ports" on page 195.

FREQUENCY

Determines the monitor frequency. Available frequencies depend on the selected monitor. The LCD resolution defaults to 60.00 Hz, which is the optimal refresh rate for the RED LCDs.

For HD-SDI monitors, the frequency depends on the project time base. For more information, go "Record/Monitor Out Ports" on page 195.

HD-SDI Auto: Sets the frequency equal to the Project Time Base, except when the Project Time Base is 47.95/48 fps. When the Project Time Base is 47.95/48 fps, the frequency is half that rate (23.98/24 Hz).

DISPLAY PRESET

Select the Color Space and Gamma Curve combination for the monitor. For more information, go to "Image Pipeline" on page 63.

TOOLS

Enables the false color modes on the monitor. For more information, go to "False Color Modes" on page 75.

FLIP VIDEO

NOTE: This setting is NOT available on the DSMC2 RED Touch 4.7" LCD, DSMC2 RED Touch 7.0" LCD, RED Touch 7.0" LCD, RED Pro Touch 7.0" LCD, and DSMC2 Touch 7.0" Ultra-Brite LCD.

Flip footage horizontally, so that it is upside down. This setting only affects the monitor, and does not affect captured footage.

FRAMED OVERLAY

The video display is scaled down on the monitor so that the overlay items fit outside of the video area rather than over it. This setting only affects the monitor, and does not affect captured footage.

AUTO HIDE MENUS

Hides the Upper Status Row and Lower Status Row. When this option is disabled, the video is scaled so that the menus are not overlaid on the video. When this option is enabled, the video is not scaled. This option creates a control surface on a monitor without scaling the video. This setting only affects the monitor, and does not affect captured footage.

To toggle display/hide the menus when Auto Hide Menus is enabled, perform either of the following actions:

- Press the **Menu** button.
- Tap the touchscreen.

NOTE: Enabling this option on a non-control surface results in the menus never displaying on that monitor.

FLIP/MIRROR

NOTE: This setting is ONLY available on the DSMC2 RED Touch 4.7" LCD, DSMC2 RED Touch 7.0" LCD, RED Touch 7.0" LCD, RED Pro Touch 7.0" LCD, and DSMC2 Touch 7.0" Ultra-Brite LCD.

Mirror and flip (invert) the graphical user interface (GUI) and footage, effectively rotating the entire displayed image 180°. Use this setting when mounting a monitor or the entire camera rig upside down. This setting only affects the monitor, and does not affect captured footage.

UI FLIP/MIRROR

NOTE: This setting is NOT available on the DSMC2 RED Touch 4.7" LCD, DSMC2 RED Touch 7.0" LCD, RED Touch 7.0" LCD, RED Pro Touch 7.0" LCD, and DSMC2 Touch 7.0" Ultra-Brite LCD.

Flip the GUI vertically and mirror horizontally (not rotated). Use this setting when mounting a monitor upside down. This setting only affects the monitor, and does not affect captured footage.

BRIGHTNESS

Control the brightness of each LCD and EVF. Move to the right for a brighter display; move to the left for a dimmer display.

PRIORITY

The camera can only have one (1) control monitor for interacting with camera settings. The Priority tab determines the order in which a monitor becomes the control monitor. If you plan on removing or adding monitors during a shoot, set up the priority list ahead of time.

For a monitor to become the control monitor, the following must occur:

- The monitor must be set to Overlay mode in the Monitor Control menu.
- Each monitor that has higher priority on the list must be either detached or not set to Overlay mode.

TEST SIGNAL

Use the Test Signal menu to replace the video monitor outputs with one of the following video test patterns:

- Chip Chart
- SMPTE Bars
- Luma

NOTE: Test signals are not recordable; they are provided to help align external HD-SDI monitors.

AUDIO TONE

To apply an audio tone, follow the instructions below:

1. Go to **Menu** > **Monitoring** > **Test Signals**.
2. Toggle **Tone** On/Off.

LOOK AROUND

To enable Look Around, go to **Menu** > **Monitoring** > **Look Around**.

When Look Around is enabled, the Frame Guide and recording area are scaled down on the display so that you can see what images will enter the recording area.

To assign a Shading overlay to the Look Around area (the area outside of the recording area), go to "General Tab" on page 81.

Look Around limits the available frame rates. At high resolutions, the recording area on the display shows the full sensor area or full sensor height, so there is no extra room for Look Around.

Look Around may affect the recorded file:

- **R3D**: Only the area inside the frame is recorded; the Look Around area is NOT recorded.
- **Apple ProRes**: The full image is recorded, including the Look Around area.
- **Avid DNxHD/HR**: The full image is recorded, including the Look Around area.

ADVANCED

Provides access to additional monitor settings.

VIDEO

SMALL DIALOGS ON 9" LCD

The dialogs on the RED Touch 9.0" LCD are smaller than the default dialogs.

ALLOW REDUCED JUDDER PREVIEW

Reduced Judder Preview allows the camera to preview images at a refresh rate that is twice the project time base. For example, if the project time base is 23.98 FPS or 24.00 FPS, enabling Reduced Judder Preview causes the LCD or EVF to have a refresh rate of 48 Hz (50 Hz).

You cannot use Reduced Judder Preview when:

- Varispeed is enabled.
- Speed Ramp mode is enabled.
- Genlock is enabled.
- The shutter angle is 180° or greater.

NOTE: When you disable Reduced Judder Preview mode, the image on the EVF may be disrupted for up to three (3) seconds.

GLOBAL FLIP/MIRROR

Applies Flip/Mirror to all monitors. For more information, go to "Flip/Mirror" on the previous page.

DISABLE LCD TEMPERATURE WARNINGS

Disables the “cooling advised” messages for the DSMC2 Touch 7.0" Ultra-Brite LCD. For more information, go to "Cooling Advised Messages" on page 177.

OUTPUT SHARPNESS

Control the sharpness of each monitor output. Move to the left for a sharper image; move to the right for a less sharp image.

NOTE: The sharpness setting affects the Histogram, RAW Level Bars, RAW Clip Meter, and false color modes. For more information, go to "Histogram" on page 53 and "False Color Modes" on the next page.

NOTE: The camera applies the sharpness setting to recorded proxy files.

AUTO FOCUS PEAKING

When Auto Focus Peaking mode is enabled (either Focus or Edge), the camera automatically goes onto Focus Peaking mode when you manually adjust the focus via the lens.

- **Off**: The camera does not automatically go into Focus Peaking mode.
- **Focus**: The camera automatically goes into Focus Peaking mode when you manually adjust the focus via the lens. Emphasizes contrast and edges in the image without changing brightness or image content making it easier to judge focus.
- **Edge**: The camera automatically goes into Focus Peaking mode when you manually adjust the focus via the lens. Shows the edges/outlines of objects that are in focus.

TOUCH

- **Lock Touchscreen**: Touchscreen control is locked. To unlock, tap the screen and follow the on-screen instructions.
- **Pinch to Magnify**: Move two (2) fingers apart or together to toggle Magnify. For more information, go to "Display Modes: Magnify" on page 77.
- **Double Tap Right to Record**: Double-tap the right 25% of the video area on the LCD to toggle record.
- **Double Tap Left to AF**: Double-tap the left 25% of the video area on the LCD to start autofocus when compatible lenses are used.

GENLOCK OFFSET

Offset the video of the HD-SDI out to align it with the genlock signal:

- **Negative offset**: Advances the video, so the video reaches the switcher earlier than it would otherwise.
- **Positive offset**: Delays the video, so the video reaches the switcher later than it would otherwise.

OVERLAYS MENU

The Overlays menu includes settings that display on top of the monitor image.

TOOLS

The Tools menu provides access to false color and display modes.

For more information, see the Exposure with RED Cameras: False Color & Zebra Tools article, available at www.red.com/learn/red-101/exposure-false-color-zebra-tools.

FALSE COLOR MODES

False color modes include:

- "False Color Modes: Off" below
- "False Color Modes: Exposure" on the next page
- "False Color Modes: Video" on the next page
- "False Color Modes: Focus" on the next page
- "False Color Modes: Edge" on the next page
- "False Color Modes: Peaking" on page 77
- "False Color Modes: Gio Scope" on page 77

NOTE: Only monitors with the Tools check box selected in the Monitor Control menu show the false colors. For more information, go to "Tools" on page 71.

NOTE: The sharpness setting affects the false color modes. For more information, go to "Output Sharpness" on the previous page.

NOTE: False color modes affect video recorded through HD-SDI to an external recorder if the Tools check box is selected in the Monitor Control menu. When recording through HD-SDI, use false color modes only to help configure project settings, and then disable the mode before recording.

NOTE: Since the 3D LUT modifes the data displayed for the exposure tools, you cannot use the exposure tools with a 3D LUT.

DISPLAY MODES

Display modes include:

- "Display Modes: Magnify" on page 77
- "Display Modes: Log View" on page 78
- "Display Modes: RAW" on page 78
- "Display Modes: Horizon" on page 78
- "Display Modes: Zebras" on page 79

FALSE COLOR MODES: OFF

To disable all false color modes, go to **Menu** > **Overlays** > **Tools** > **False Color** and select **Off** from the **False Color** drop-down menu.

FALSE COLOR MODES: EXPOSURE

To enable, go to **Menu** > **Overlays** > **Tools** > **False Color** and select **Exposure** from the **False Color** drop-down menu.

The Exposure tool displays a color overlay on top of a desaturated image that allows you to check for proper exposure. When enabled, the “E√” indicator displays in the Lower Status Row.

The Exposure meter colors indicate the following information:

- **Purple**: Underexposed; indicates sensor exposure levels that may be noisy if gained up in post production.
- **Green**: IRE 41–48; based on the RGB levels of the video out signal and not the RAW data.
- **Red**: Overexposed; indicates sensor exposure levels that are clipping.

Purple (underexposure) and red (overexposure) are based on RAW data and show areas that are clipping or close to clipping. The RGB settings DO NOT affect the Exposure indicators.

FALSE COLOR MODES: VIDEO

To enable, go to **Menu** > **Overlays** > **Tools** > **False Color** and select **Video** from the **False Color** drop-down menu.

The Video tool displays a color overlay that indicates the video level of the RGB monitor path (calibrated to the SMPTE test signal). When enabled, the “V√” indicator displays in the Lower Status Row.

Colors are based on the RGB levels of the video out signal (that is, the “cooked” look, and not RAW data). The RGB settings affect the Video indicators.

The Video indicators represent the following IRE values (at all other values, the desaturated image represents the luminance value of the ISO adjusted image):

- **Purple**: IRE 0–4
- **Blue**: IRE 5
- **Teal**: IRE 10–12
- **Green**: IRE 41–48
- **Pink**: IRE 61–70
- **Straw**: IRE 92–93
- **Yellow**: IRE 94–95
- **Orange**: IRE 96–98
- **Red**: IRE 99–100

FALSE COLOR MODES: FOCUS

To enable, go to **Menu** > **Overlays** > **Tools** > **False Color** and select **Focus** from the **False Color** drop-down menu.

The Focus tool emphasizes contrast and edges in the image without changing brightness or image content making it easier to judge focus. Adjust zoom and focus to easily see which objects are coming into focus.

When enabled, the “F√” indicator displays in the Lower Status Row.

FALSE COLOR MODES: EDGE

To enable, go to **Menu** > **Overlays** > **Tools** > **False Color** and select **Edge** from the **False Color** drop-down menu.

Shows the edges/outlines of objects that are in focus. When enabled, the “F√” indicator displays in the Lower Status Row.

NOTE: The Edge setting may interfere with recordings done via HD-SDI in Clean mode.

FALSE COLOR MODES: PEAKING

To enable, go to **Menu** > **Overlays** > **Tools** > **False Color** and select **Peaking** from the **False Color** drop-down menu.

The Focus Peaking tool displays a red overlay on top of in-focus edges. Select a Peaking Level of 1 to 10 (weak to strong). The RGB settings affect the indicators.

The Focus Peaking indicators are applied after the image is scaled to a monitor, so the indicators may look different on different monitors.

When enabled, the “P√” indicator displays in the Lower Status Row.

FALSE COLOR MODES: GIO SCOPE

To enable, go to **Menu** > **Overlays** > **Tools** > **False Color** and select **Gio Scope** from the **False Color** drop-down menu.

Displays a color overlay on top of a desaturated image, identifying 16 increments within the dynamic range of the sensor.

When enabled, the “G√” indicator displays in the Lower Status Row. The Gio Scope indicators are based on RAW data. The RGB settings (color temperature, ISO, LGG, etc.) DO NOT affect the indicators.

Each number indicates a different increment of dynamic range.

- **10**: Represents mid-grey.
- **16**: Represents the top increment, and is broken up into 1/8th sub-increments to show highlight roll-off. Each 1/8th increment is represented by a different shade of red, ranging from light red (less light) to dark red (most light).

DISPLAY MODES: MAGNIFY

To enable, go to **Menu** > **Overlays** > **Tools** and select **Magnify**.

The Magnify tool displays the central region of the sensor in 1:1 pixel resolution on an attached monitor. When enabled, the 1:1 text in the Lower Status Row turns green, and the AF Window and the magnified region display. The AF Window determines the center point of the magnified region. If the lens or lens mount is not capable of autofocus with the camera, use Confirm mode to turn on the AF Window. Sharpening is disabled when Magnify mode is enabled. The camera automatically exits Magnify mode when recording begins.

The Magnify tool magnifies a 1920 x 1020 region, centered on a 1920 x 1080 display. If the resolution is lower than 1920 x 1020, the image border cannot be magnified. Use the following equations to determine the area of the image border that will not be magnified:

- **Border width**: (1920 – W) / 2
- **Border height**: (1020 – H) / 2

NOTE: Frame rate and resolution cannot be modified in Magnify mode.

DISPLAY MODES: RAW

NOTE: RAW is only available in Legacy mode. For more information, go to "Image Pipeline" on page 63.

To enable, go to **Menu** > **Overlays** > **Tools** and select **RAW**.

When enabled, the camera displays images unaffected by the RGB settings (color temperature, ISO, LGG, etc.). RAW affects the video recorded via HD-SDI to an external recorder. RAW image parameters DO NOT affect image metadata; the parameters only affect the monitor output.

The RAW image parameters are:

- **Color Space**: DRAGONcolor2
- **Gamma Space**: REDgamma4
- **White Balance**: 5600K
- **ISO**: 800 ISO
- **Tint**: 0 Tint

NOTE: In RAW mode, the following controls are disabled on all cameras: color temperature, tint, saturation, RGB gains, ISO, contrast, brightness, shadow, FLUT®, exposure compensation, LGG controls, RGB curves, and luma curve.

DISPLAY MODES: LOG VIEW

NOTE: Log View is only available in IPP2 mode. For more information, go to "Image Pipeline" on page 63.

To enable, go to **Menu** > **Overlays** > **Tools** and select **Log View**.

When enabled, the camera displays images in REDWideGamutRGB and Log3G10 that are only affected by the ISO, Exposure Adjust, Color Temperature, and Tint settings. This allows you to quickly see ungraded footage that remains unaffected by creative decisions such as the choice of 3D LUT or CDL. Log View affects the video recorded via HD-SDI to an external recorder, but does not affect the R3D file itself.

DISPLAY MODES: HORIZON

To enable, go to **Menu** > **Overlays** > **Tools** and select **Horizon**.

Displays an overlay that provides a reference to the position of the horizon. The Horizon overlay consists of two (2) short side-bars that are always horizontally centered on the monitor, and a single longer horizon-line that adjusts to the horizon based on the orientation of the camera.

The side-bars are green if the pitch is within +/– 1° of the calibrated zero position, otherwise they are red. The horizon-line is green if the roll is within +/– 1° of the calibrated zero position, otherwise it is red.

To add numerical values for the pitch and roll to the Horizon overlay, follow the instructions below:

1. Go to **Menu** > **Overlays** > **Custom**.
2. Select **Create...**, **Clone...**, or **Edit...**, respectively, for the desired overlay action.
3. Select a location on the interface to add the numerical data for the Horizon overlay.
4. Select **Motion: Gyro Data (GYRO)** from the **Item** drop-down menu.
5. Select the desired text size.
6. Select **Add**.
7. Select **Save**.
8. Apply the custom overlay to a monitor. For more information, go to "Monitor Preferences" on page 70.

NOTE: The internal gyroscope and accelerometer must be calibrated for the Horizon overlay to function properly. For more information, go to "Gyroscope and Accelerometer Calibration" on page 133.

DISPLAY MODES: ZEBRAS

Use Zebra mode to enable and adjust the upper and lower values for two (2) independent zebra indicators. Use Zebra 1 for highlight exposure, and use Zebra 2 for mid-tones or shadows. Zebras are visible in Magnify mode and are disabled by default.

The camera offers two (2) zebra types:

- **Video**: IRE-based mode; evaluates based on the current ISO and Look settings, and not the RAW image.
- **RAW**: Evaluates based on the RAW image.

For more information, see the Exposure with RED Cameras: False Color & Zebra Tools article, available at www.red.com/learn/red-101/exposure-false-color-zebra-tools.

ENABLE ZEBRA INDICATORS

1. Go to **Menu** > **Overlays** > **Tools** and select **Zebras**.
2. Select a **Zebra**:
    - **Zebra 1**:
        - **Video**: Areas of the image exposed within the IRE range are indicated by red diagonal lines at –45°. Default is 98 to 100 IRE.
        - **RAW**: Areas of the image exposed within the range of stops are highlighted. Default is 15.80 to 16.00 stops.
    - **Zebra 2**:
        - **Video**: Areas of the image exposed within the IRE range are indicated by green diagonal lines at 45°. Default is 41 to 48 IRE.
        - **RAW**: Areas of the image exposed within the range of stops are highlighted. Default is 0.00 to 4.00 stops.
3. If you selected RAW, select how you want the RAW areas to look by setting up the **Raw Style** options (fill and color).

CAMERA AND LENS STATUS

To set up what camera and lens info displays as part of the overlay, go to **Menu** > **Overlays** > **Status**.

CAMERA STATUS OVERLAYS

EXPOSURE

- **Shutter Speed**: Displays the exposure time in seconds (1/xx sec). When you change the frame rate in this mode, the shutter speed stays the same, but the shutter angle changes.
- **Shutter Angle**: Displays the exposure as an angle (1° to 360°). When you change the frame rate in this mode, the shutter angle stays the same, but the shutter speed changes. (Default)

POWER

- **Current Batt %**: Displays the remaining percentage of active battery. (Default)
- **Total Time**: Displays the total run-time left of battery power, taking into account all available batteries.
- **Voltage**: Displays the voltage.

VU METER

- **Input**: Displays levels of audio inputs (pre-mixer). (Default)
- **Output**: Displays levels of audio outputs (post-mixer).

HISTOGRAM

- **RGB**: Displays red, green, and blue channels on histogram. (Default)
- **Luma**: Displays luma channel on histogram.

MEDIA

- **Percentage**: Displays media space remaining as a percentage.
- **Time Remaining**: Displays media space remaining as time in hours and minutes (HHH:MM). (Default)

LENS STATUS OVERLAYS

APERTURE INCREMENTS

- **1/4 Stop**: Aperture increments in 1/4 stops.
- **1/3 Stop**: Aperture increments in 1/3 stops. (Default)

FOCUS DISTANCE

- **Metric**: Displays lens focus distances in meters.
- **Imperial**: Displays lens focus distances in feet and inches. (Default)

GUIDES

Use the Guides menu to configure the Frame Guide, Action Guide, and Title Guide.

MODE

- **Off**: Disable all guides.
- **Full**: Guide has the same aspect ratio as the record format.
- **4:3, 16:9, 1.85:1, 1.9:1, 2.4:1**: Guide has the selected aspect ratio.
- **User**: Select an aspect ratio from the drop-down menu that displays when you select this option.
- **Absolute**: Guide is defined by absolute pixel dimensions rather than aspect ratio and scale. When you select Absolute, the Width/Height fields replace the Scale field.

SCALE

Percentage to scale guide from its maximum possible size. Available range is 0 to 100%.

WIDTH/HEIGHT

The Width/Height fields replace the Scale field when you select Absolute from the Mode drop-down menu. Select the values for the width and height of the guide in pixels.

OFFSET X/Y

Percentage to offset guide from its default centered position. Available range is –100 to 100%.

- **100%**: Right-aligned (for X offset) and bottom-aligned (for Y offset).
- **-100%**: Left-aligned (for X offset) and top-aligned (for Y offset).

APPEARANCE

- **Line Style**: Select one of the following line styles: Solid, Dashed, or Bracket.
- **Color**: Select the color that has the highest contrast to the scene. The default is White.
- **Opacity**: Set the guide opacity. Available options are 25%, 50%, 75% and 100%.

RELATIVE TO FRAME GUIDE

Select the **Relative to Frame Guide** check box to size and position the guide relative to (and have it bounded by) the Frame Guide instead of the record format.

NOTE: The Relative to Frame Guide check box is available on the Action Guide and Title Guide tabs.

GENERAL TAB

Enable/Disable and select the location (Relative To), color, and opacity of the following elements:

- **Center**: The center crosshair. You can select the following shapes: Cross (crosshair), Small Dot, Medium Dot.
- **Grid**: Rule-of-thirds grid.
- **Shading**: The shaded region outside of the area of interest.

CUSTOM OVERLAYS

Create custom overlays that include specific items. Overlays can be stored on the camera or transferred to SSD to be shared with other cameras.

- **Camera**: Overlays saved internally on the camera display in the Overlay drop-down menu on the Monitor Control > Monitor tab.
- **Media**: Overlays saved to an SSD can be found at On Media: \overlays:.

NOTE: Overlays that end with (RED) are provided by default and cannot be edited, deleted, or exported.

OVERLAY ACTIONS

- **Create...**: Create a new custom overlay using a blank overlay template in the Overlay Editor.
- **Clone...**: Create a new custom overlay using the selected camera overlay as a template in the Overlay Editor.
- **Edit...**: Edit the selected camera overlay in the Overlay Editor.
- **Delete**: Delete the selected camera overlay.

EXPORT AND IMPORT OVERLAYS

- ➡ : Export selected overlay from camera to SSD.
- ➡ **All**: Export all overlays from camera to SSD.
- ⬅ : Import selected overlay from SSD to camera.
- ⬅ **All**: Import all overlays from SSD to camera.

CREATE AND EDIT OVERLAYS

1. Go to **Menu** > **Overlays** > **Custom**.
2. Select **Create**, or select an existing overlay and select **Clone** or **Edit**.
3. If creating a new overlay, enter a name for the overlay and select **OK**.
4. Select any of the following check boxes to add the corresponding guides to the overlay:
    - Frame Guide
    - Action Guide
    - Title Guide
5. Select a button on the matrix to add a user interface element to that position on the matrix.

    By default, the Magnify indicator (MI) is on the top left, the Record indicator (REC) is on the top right, the Clip Name (CLIP) is on the bottom left, and the Timecode (TC) is on the bottom right.

    Selecting one (1) of the buttons opens a new dialog that lets you choose a user interface element.
6. Select the **Item** that you want to add.
7. Select the **Size** of the item.
8. If adding a Custom Label (LBL), enter the **Custom Text** for that item.
9. Select **Add** to return to the previous screen.
10. Add all of the items to the overlay.
11. Select **Create** or **Save**.

    The new overlay displays in the Camera list.

    NOTE: Except for the Custom Label (LBL), you can only add each element once. If you add an element you have already added to the overlay, the element moves to the new position.

POWER MENU

The Power menu displays the power status of all attached power sources and allows you to turn off the camera.

To access the Power Menu, go to **Menu** > **Power**.

POWER IN

The power status displays for all attached power devices. The menu displays the voltage of the source or the relative percentage of the power left, as well as the time left, if applicable.

LOW VOLTAGE WARNING

When the Low Voltage Warning is enabled and the incoming voltage is less than the level you select, the camera shows a warning message and the Power Status indicator in the Lower Status Row turns red. This warning gives you the opportunity to change the battery or prepare for the camera to lose power. The warning continues to show until the incoming voltage is equal to or higher than the level you select.

RED does not recommend a specific voltage threshold, since that depends on the power draw of the attached accessories.

To enable the Low Voltage warning, follow the instructions below:

1. Go to **Menu** > **Power**.
2. Select the **Low Voltage Warning** check box.
3. Select the voltage level threshold. The camera warns you when the incoming voltage is less than this level.

POWER OUT

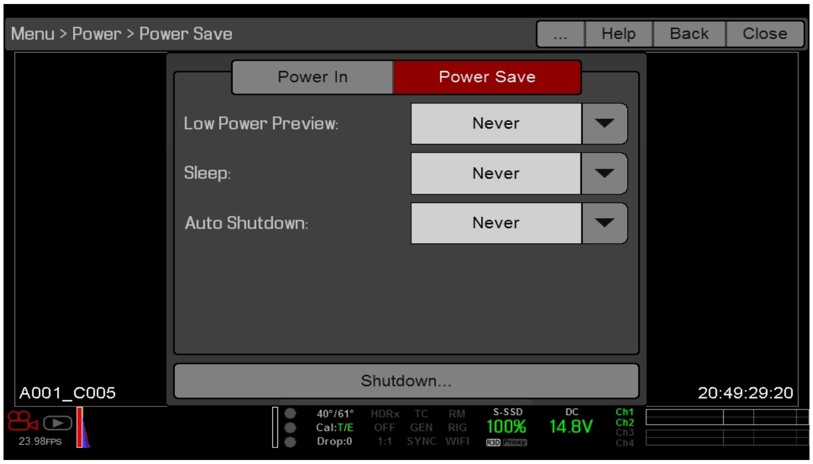
The Power Out menu shows the status of the power out ports on the camera. The statuses are:

- **N/A**: The device is not present.
- **OK**: The power out port is functional.
- **FAULT**: A short or overcurrent tripped the electronic fuse. Remove the device that is connected to the port, as it may be drawing too much power. Select **RESET** to clear the fault.

POWER SAVE

You can select the following power saving options (the default for each is Never):

- **Low Power Preview**: The camera uses a lower amount of power after the specified period of inactivity.
- **Sleep**: All monitors turn off and keys do not perform mapped actions after the specified period of inactivity. Tap the touchscreen or press a key to exit Sleep mode.
- **Auto Shutdown**: The camera turns off after the specified period of inactivity.


Menu > Power > Power Save
...
Help
Back
Close
Power In
Power Save
Shutdown...
A001_C005
20:49:29:20
23.98FPS
40°/61°
Cal:T/E
Drop:0
HDRx
OFF
1:1
TC
GEN
SYNC
RM
RIG
WIFI
S-SSD
100%
R3D
Proxy
DC
14.8V
Ch1
Ch2
Ch3
Ch4

Low Power Preview: Never

Sleep: Never

Auto Shutdown: Never

Figure: Power Save

SHUTDOWN

Shutdown controls are interlocked to prevent the camera from being accidentally turned off. For more information about different ways to turn off your camera, go to "Turn Off the Camera" on page 35.

1. Go to **Menu** > **Power**.
2. Select **Shutdown**.

   The Shutting Down... message displays and the camera turns off.

PLAYBACK

To view clips from the SSD:

- Go to **Menu** > **Playback**.
- Press the **Record/Playback** toggle in the lower left corner of the touchscreen.

NOTE: The camera uses RGB color space in Playback mode by default, regardless of settings in Record mode. To playback clips in RAW mode, enable to RAW mode. For more information, go to "Tools" on page 75.

PLAYBACK MENUS

In Playback mode, the menu is pared-down, so you cannot access all menus. Some menus offer different options.

MEDIA

Includes the Playlist menu, which lists all available clips on the attached SSD. You can perform the following actions:

- ➡ : Move selected clip to the Play List.
- **All** ➡ : Move all clips to the Play List.

RECORD (EXIT)

Select **Record** to exit Playback mode. You can also press any button mapped to Record to exit Playback mode.

PLAYBACK STATUS BAR

Displays the progress of the clip during playback. When using the touchscreen, swipe your finger right and left to fast-forward and rewind the clip, respectively.

PLAYBACK CONTROLS

GENERAL PLAYBACK CONTROLS

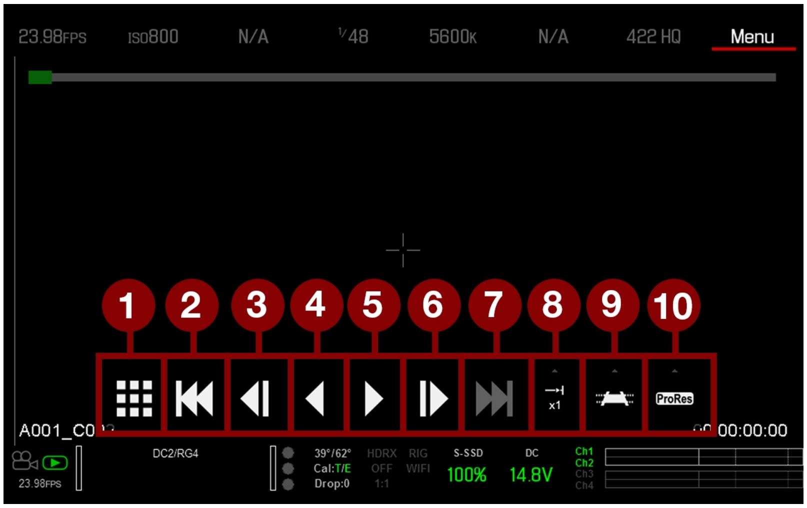

23.98FPS
ISO800
N/A
1/48
5600K
N/A
422 HQ
Menu
1
2
3
4
5
6
7
8
9
10
x1
ProRes
A001_C0
00:00:00
DC2/RG4
23.98FPS
39°/62°
Cal:T/E
Drop:0
HDRX
OFF
1:1
RIG
WIFI
S-SSD
100%
DC
14.8V
Ch1
Ch2
Ch3
Ch4

Figure: Playback Controls

#	CONTROL	DESCRIPTION
1	Clips	View clips as thumbnails
2	Load Previous Clip	Loads the previous clip in the playlist.
3	Frame-by-Frame Reverse	Moves through the clip frame-by-frame in reverse.
4	Reverse Play/Pause toggle	Plays clip in reverse, and toggles between play and pause.
5	Play/Pause toggle	Toggles between play and pause.
6	Frame-by-Frame Forward	Moves through the clip frame-by-frame.
7	Load Next Clip	Loads the next clip in the playlist.
8	Play Options	Displays the following subset of options: Play Once, Loop, Loop Playlist, and Playback Speed.
9	Marker Options	Displays the following subset of options: In Point, Remove In/Out Point, Out Point, Previous Marker, and Next Marker.
10	Apple ProRes Playback	Displays the following subset of options: R3D and ProRes

PLAYBACK FILE TYPE

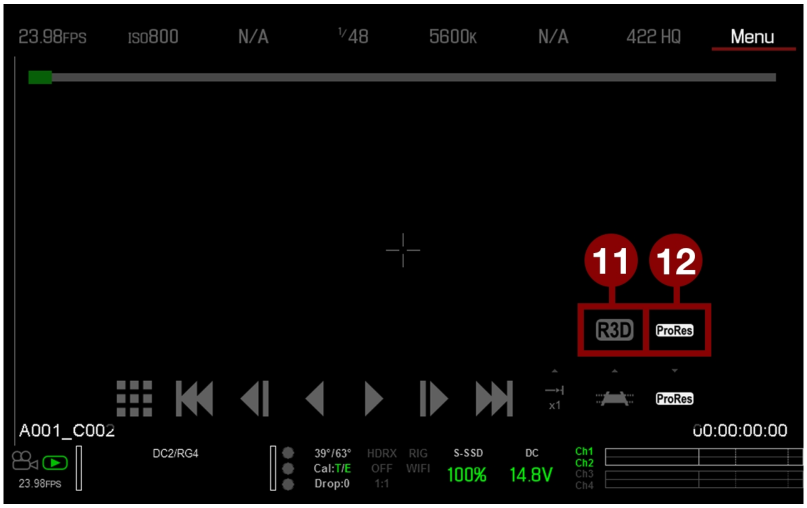

23.98FPS
ISO800
N/A
1/48
5600K
N/A
422 HQ
Menu
11
12
R3D
ProRes
x1
ProRes
A001_C002
00:00:00:00
23.98FPS
DC2/RG4
39°/63°
Cal:T/E
Drop:0
HDRX
OFF
1:1
RIG
WIFI
S-SSD
100%
DC
14.8V
Ch1
Ch2
Ch3
Ch4

Figure: Playback Controls

#	CONTROL	DESCRIPTION
11	R3D Playback	Plays the R3D clip.
12	ProRes	Plays the Apple ProRes clip.

PLAYBACK SPEED AND LOOPING

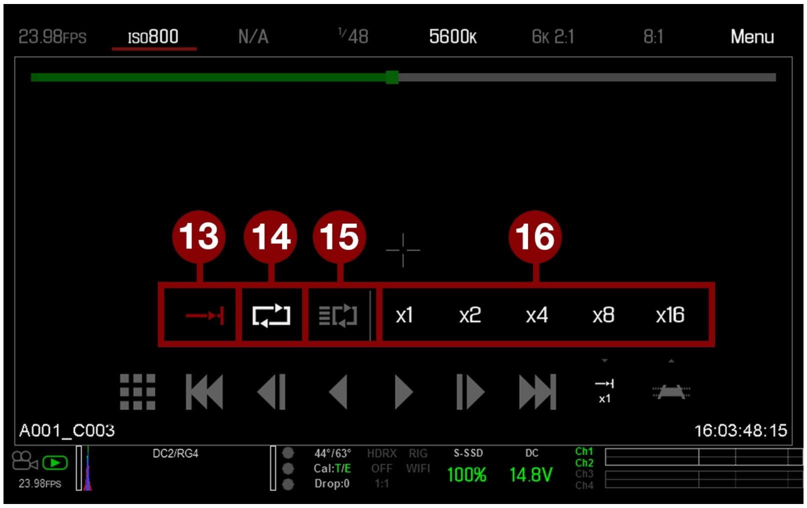

23.98FPS
ISO800
N/A
1/48
5600K
6K 2:1
8:1
Menu
13
14
15
16
x1
x2
x4
x8
x16
A001_C003
16:03:48:15
23.98FPS
DC2/RG4
44°/63°
Cal:T/E
Drop:0
HDRX
OFF
1:1
RIG
WIFI
S-SSD
100%
DC
14.8V
Ch1
Ch2
Ch3
Ch4

Figure: Playback Controls

#	CONTROL	DESCRIPTION
13	Play Once	Plays clip to the end, and does not repeat the clip.
14	Loop	Plays the clip on a loop.
15	Loop Playlist	Loops all clips in the playlist. To create a playlist, go to **Menu** > **Media** > **Playlist**, and move clips to the **Play List** field.
16	Playback Speed	Option to select x1, x2, x4, x8, or x16 playback speed.

PLAYBACK MARKERS

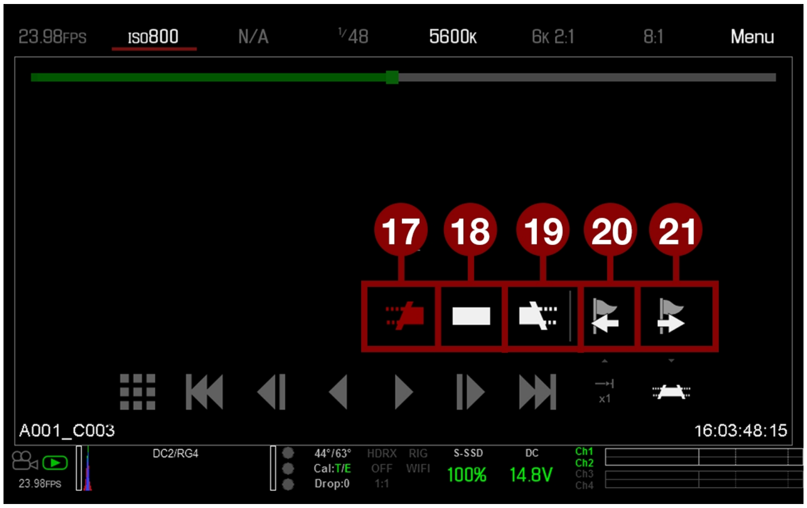

23.98FPS
ISO800
N/A
1/48
5600K
6K 2:1
8:1
Menu
17
18
19
20
21
x1
A001_C003
16:03:48:15
23.98FPS
DC2/RG4
44°/63°
Cal:T/E
Drop:0
HDRX
OFF
1:1
RIG
WIFI
S-SSD
100%
DC
14.8V
Ch1
Ch2
Ch3
Ch4

Figure: Playback Controls

#	CONTROL	DESCRIPTION
17	In Point	Sets a red In Point marker in the Playback Status Bar. Use an In Point marker in conjunction with an Out Point marker to play only a certain portion of a clip. The In/Out Point markers help when the clip is long and you want to focus on a particular segment.
18	Remove In/Out Point	Removes the In/Out Point markers and skips to the end of the clip.
19	Out Point	Sets a red Out Point marker in the Playback Status Bar. Use an Out Point marker in conjunction with an In Point marker to play only a certain portion of a clip. The In/Out Point markers help when the clip is long and you want to focus on a particular segment.
20	Previous Marker	Goes to the previous marked frame, which displays as a red line in the Playback Status Bar. Disabled when there are no marked frames.
21	Next Marker	Goes to the next marked frame, which displays as a red line in the Playback Status Bar. Disabled when there are no marked frames.

MEDIA MENU

The Media Menu allows you to format and eject an SSD and to view and load clips on the SSD.

For more information about using media, see the DSMC Media Operation Guide , available at www.red.com/downloads.

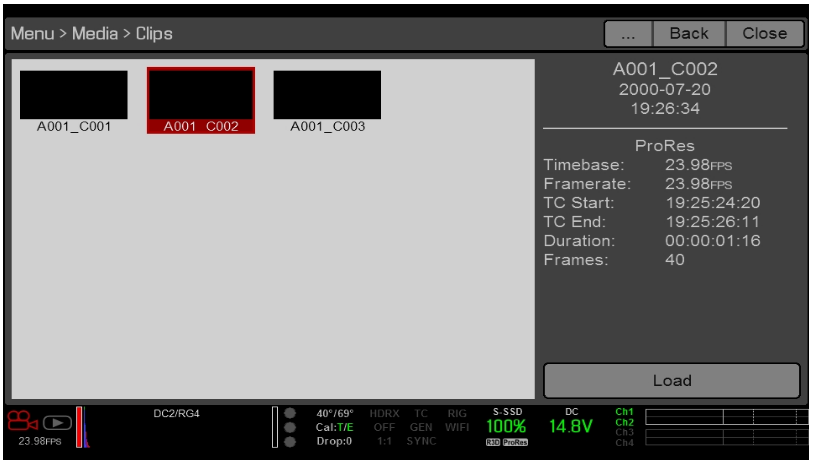
DEVICE

Format and eject (unmount) the SSD.

To see information about the SSD in the camera, select **More Info...**.

CLIPS

View and load clips on the SSD in thumbnail view.


Menu > Media > Clips
...
Back
Close
A001_C001
A001_C002
A001_C003
Load
23.98FPS
DC2/RG4
40°/69°
Cal:T/E
Drop:0
HDRX
OFF
1:1
TC
GEN
SYNC
RIG
WIFI
S-SSD
100%
R3D
ProRes
DC
14.8V
Ch1
Ch2
Ch3
Ch4

A001_C002
2000-07-20
19:26:34

ProRes
Timebase: 23.98FPS
Framerate: 23.98FPS
TC Start: 19:25:24:20
TC End: 19:25:26:11
Duration: 00:00:01:16
Frames: 40

Figure: Clips Menu

PRESETS MENU

The camera has the following presets:

- **Camera Presets**: These store and recall camera setup information, such as in-camera Looks, key mappings, I/O configurations, and more. The camera has a number of factory-installed presets.
- **Looks**: These allow you to save the specific color, image, white balance, and detail settings to be used for other projects. Looks that are generated in-camera display on the Camera Presets tab. Looks that are generated in REDCINE-X PRO and are imported to the camera display on the Looks tab.
- **Auto Presets**: These allow you to specify pre-selected presets for Startup, Preview, Motion, Stills, and Playback.

You can create custom presets and Looks. Presets and Looks can be stored on the camera or transferred to SSD, so that you can build a library of presets and Looks, or quickly copy presets and Looks from one camera to another via SSD.

- **Camera**: Presets or Looks that are saved internally on the camera.
- **Media**: Presets or Looks that are on the SSD in the path shown (for example, On Media: \presets:).

CAMERA PRESETS

NOTE: You cannot update, delete, or export factory-installed presets, which end with "(RED)".

PRESETS ACTIONS

- **Apply**: Apply the selected preset.
- **Create...**: Create a new preset using the current settings.
- **Update...**: Update the selected preset by allowing the parameter set to be modified and all the values to be updated to their current in-camera values.
- **Clone...**: Create a new preset using the selected preset as a template.
- **Delete**: Delete the selected preset.

EXPORT AND IMPORT PRESETS

Presets can be stored on the camera or transferred to SSD to be shared with other cameras. When exporting presets from camera to an SSD, the presets are saved to a folder on the SSD called “Presets”. When importing presets from an SSD to camera, the presets must be stored on the SSD in a folder called “Presets”.

- ➡ : Export selected preset from camera to SSD.
- ➡ **All**: Export all presets from camera to SSD.
- ⬅ : Import selected preset from SSD to camera.
- ⬅ **All**: Import all presets from SSD to camera.

CREATE PRESETS

1. Set up the camera how you want the preset to be configured. For example, if you want to create a preset specifically for your zebra indicators, first configure the zebras the exact way that you want them to be in the preset.
2. Go to **Menu** > **Presets** > **Camera Presets**.
3. Select **Create**, or select an existing preset and select **Clone** or **Update**.
4. If creating a new preset, enter a name for the preset and select **OK**.
5. Select the following tabs to display different sets of preset options: **Display**, **Key**, **Look**, **Project**, and **System**.
6. Select the following:
    - ➡ : Add selected setting to the preset.
    - ➡ **All**: Add all settings to the preset.
    - ⬅ **X**: Remove selected setting from the preset.
7. Select **Create**.

    The preset is saved and stored in the camera.

LOOKS

A Look is made up of the following settings: Color, Gain, FLUT, Sharpness, Curves, Color Space, Gamma, Color Temperature, and LGG (Lift, Gamma, Gain). These settings are configured either in-camera or in REDCINE-X PRO®.

CREATE AND MANAGE IN-CAMERA LOOKS

Create in-camera looks in the **Menu** > **Presets** > **Camera Presets** tab. Modify and manage the in-camera Looks the same way as any other presets created in the Camera Presets tab. For more information, go to "Camera Presets" on the previous page.

IMPORT LOOKS FROM REDCINE-X PRO

1. While your SSD is mounted to your computer, create a folder on the SSD called **Looks**.
2. Save your RMD files (that have been exported from REDCINE-X PRO) to the **Looks** folder on the SSD.
3. Eject the SSD from your computer.
4. Mount the SSD to your camera.
5. Go to **Presets** > **Looks**.
6. Select one (1) of the following:
    - ⬅ : Import selected Look from SSD to camera.
    - ⬅ **All**: Import all Looks from SSD to camera.

For more information, see the REDCINE- X PRO: Saving Looks to Camera video tutorial , available at www.red.com/learn/workflow/redcine-x-saving-looks-camera.

MANAGE IMPORTED LOOKS

Manage Looks imported from REDCINE-X PRO in the **Presets** > **Looks** tab. When exporting Looks from camera to SSD, the Looks are saved to a folder on the SSD called “Looks”.

You can perform the following actions with imported Looks:

- ➡ : Export selected Looks from camera to SSD.
- ➡ **All**: Export all Looks from camera to SSD.
- **Apply**: Apply the selected Look.
- **Delete**: Delete the selected Look.

AUTO PRESETS

- **Startup**: The selected preset is applied every time the camera is turned on.
- **Motion**: The selected preset is applied every time Motion mode is enabled.
- **Stills**: The selected preset is applied every time Stills mode is enabled.
- **Playback**: The selected preset is applied every time the camera enters Playback mode.

SETTINGS MENU

PROJECT

The Project menu includes settings that define the recorded file, including recording frame rate, exposure, and format.

FRAME RATE

RECORDING FRAME RATE

Select the recording frame rate (also referred to as the capture frame rate). The recording frame rate is the number of frames per second (fps) that are recorded. The recording frame rate is different from the project time base, which is the rate at which the footage will be played back.

The default recording frame rate is 23.98 fps. If you change the project time base, the recording frame rate automatically changes its value to match the project time base.

The maximum frame rate for each format is determined by several factors, including project time base, REDCODE, and Look Around.

PROJECT TIME BASE

Select the project time base. The project time base is the rate at which the footage will be played back. The project time base displays in the lower left corner of the display.

The following project time bases are available:

- 23.98 fps (Default)
- 24.00 fps
- 25.00 fps
- 29.97 fps
- 30.00 fps
- 47.95 fps
- 48.00 fps
- 50.00 fps
- 59.94 fps
- 60.00 fps

VARISPEED

When a recording frame rate other than the current project time base is selected, the fps text turns yellow and the word Varispeed replaces the Audio Meter in the lower right corner of the display.

Starting with firmware v6.4, the camera supports recording audio in Varispeed mode. For more information, go to "Record Audio in Varispeed Mode" on page 147.

EXPOSURE/SHUTTER

Select the exposure (shutter speed / shutter angle) of each frame. You can change exposure while recording.

Decreasing shutter speed increases the amount of time that light hits the sensor, which increases exposure and motion blur of moving objects. Increasing shutter speed decreases the amount of time that light hits the sensor, which decreases exposure and motion blur of moving objects.

The Upper Status Row displays the exposure as either shutter speed or shutter angle. For more information, go to "Exposure" on page 80.

If the camera is able to achieve the target exposure, the exposure value displays in white. If the camera is unable to achieve the target exposure, the exposure value displays in yellow, and the camera uses the closest available exposure.

NOTE: If using speed ramp mode, select an exposure that is valid for each ramp target frame rate. If the camera ramps to a frame rate that is incompatible with the current exposure, the exposure changes to the longest exposure possible for the frame rate. For more information, go to "Speed Ramp Mode" on page 106.

NOTE: You cannot change the exposure when HDR is enabled.

INTEGRATION TIME

Enter the exposure value as a shutter speed (1/xx sec).

The slowest shutter speed is 1/(recording frame rate). For example, if the recording frame rate is 24 fps, the slowest available shutter speed is 1/24 sec. The fastest shutter speed is 1/131,579 sec. The default shutter speed is 1/48 sec.

SHUTTER ANGLE

Enter the exposure value as a shutter angle (xx°). The shutter angle range is 1.000° to 360.000°. The default shutter angle is 180.000°.

EXPOSURE CONVERSIONS

The table below lists common shutter speed and shutter angle equivalents. The calculations in the table use a recording frame rate of 24 fps.

SHUTTER SPEED (1/XX SEC)	SHUTTER ANGLE (°)	SHUTTER SPEED (1/XX SEC)	SHUTTER ANGLE (°)
1/32	270	1/120	72
1/48	180	1/192	45
1/50	172.8	1/384	22.5
1/60	144	1/696	12.4
1/96	90	1/1000	8.6

CONVERT SHUTTER SPEED TO SHUTTER ANGLE

Shutter Angle = (Shutter Speed x Frame Rate x 360)

Example: (1/48 x 24 x 360) = 180

CONVERT SHUTTER ANGLE TO SHUTTER SPEED

Shutter Speed = 1/(Frame Rate x 360/Angle)

Example: 1/(24 x 360/180) = 1/48

TIMECODE

RED cameras use non-drop frame timecode. For more information about timecode, go to "Timecode, Genlock, Multi-Camera Setup" on page 149.

TIMECODE DISPLAY MODE

- **Time of Day (TOD)**: Displays the time of day (HH:MM:SS:FF). TOD timecode runs continuously and is not affected by recording.
- **Edge**: Edge timecode is continuous between clips, meaning that when recording starts, timecode begins. and when recording stops, timecode stops. By default, Edge timecode default begins at 01:00:00:00, but can be configured in the Media menu when formatting an SSD.

TIMECODE SOURCE

- **RTC**: Uses the internal Real Time Clock as the timecode counter source.
- **External**: Uses the timecode from an external device connected to the timecode connector on the camera.

SLATE

Use the Slate menu to add metadata to clips. After configuring the following fields, the information populates in the Media menu when formatting media:

- Camera ID
- Camera Position

NOTE: The scene name is limited to eight (8) characters.

AUTO-INCREMENT TAKE

To automatically increment the take number when the camera stops recording, follow the instructions below:

1. Go to **Menu** > **Settings** > **Project** > **Slate** > **Scene**.
2. Enter a name in the **Scene** box.
3. Enter a value in the **Take** box.

AUTO SLATE

Frame values for **Auto Head Frames** and **Auto Tail Frames** on the **Auto Slate** tab, these values only show in-camera. The Auto Head Frames and Auto Tail Frames metadata values are currently disabled in REDCINE-X PRO.

FORMAT

To access the Format menu, go to **Menu** > **Settings** > **Project** > **Format**.

The available aspect ratios are determined by the selected resolution.

After selecting format settings, select **Set Format**.

When you lower the resolution on a camera, only a portion of the sensor is used. The camera does not downscale from full format when recording RAW.

RED RANGER FORMATS

The table below describes the formats for RED RANGER.

The table below omits rows for the anamorphic formats, since the pixel dimensions for each anamorphic format and the corresponding non-anamorphic format are the same. For more information, go to "Anamorphic" on page 103.

Using a 6:5 aspect ratio at 2x anamorphic gives you a 2.4:1 aspect ratio.

RESOLUTION	DIMENSION (PIXELS)		DIMENSIONS (MM)		
	WIDTH	HEIGHT	WIDTH	HEIGHT	DIAGONAL
8K FF	8192	4320	41.0	21.6	46.3
8K 2:1	8192	4096	41.0	20.5	45.8
8K 2.4:1 (WS)	8192	3456	41.0	17.3	44.5
8K 16:9 (HD)	7680	4320	38.4	21.6	44.1
8K 14:9	6720	4320	33.6	21.6	39.9
8K 3:2	6480	4320	32.4	21.6	38.9
8K 6:5	5184	4320	25.9	21.6	33.7
8K 8:9	3840	4320	19.2	21.6	28.9
8K 4:1	8192	2048	41.0	10.2	42.2
8K 8:1	8192	1024	41.0	5.1	41.3
7.5K FF	7680	4080	38.4	20.4	43.5
7.5K 2:1	7680	3840	38.4	19.2	42.9
7.5K 2.4:1 (WS)	7680	3240	38.4	16.2	41.7
7.5K 16:9 (HD)	7296	4104	36.5	20.5	41.9
7.5K 4:1	7680	1920	38.4	9.6	39.6
7.5K 8:1	7680	960	38.4	4.8	38.7
7K FF	7168	3780	35.8	18.9	40.5
7K 2:1	7168	3584	35.8	17.9	40.1
7K 2.4:1 (WS)	7168	3024	35.8	15.1	38.9
7K 16:9 (HD)	6720	3780	33.6	18.9	38.6

RESOLUTION	DIMENSION (PIXELS)		DIMENSIONS (MM)		
	WIDTH	HEIGHT	WIDTH	HEIGHT	DIAGONAL
7K 8:9	3360	3780	16.80	18.90	25.29
7K 6:5	4536	3780	22.7	18.9	29.5
7K 4:1	7168	1792	35.8	9.0	36.9
7K 8:1	7168	896	35.8	4.5	36.1
6.5K FF	6656	3536	33.3	17.7	37.7
6.5K 2:1	6656	3328	33.3	16.6	37.2
6.5K 2.4:1 (WS)	6656	2808	33.3	14.0	36.1
6.5K 16:9 (HD)	6144	3456	30.7	17.3	35.2
6.5K 4:1	6656	1664	33.3	8.3	34.3
6.5K 8:1	6656	832	33.3	4.2	33.5
6K FF	6144	3240	30.7	16.2	34.7
6K 2:1	6144	3072	30.7	15.4	34.3
6K 2.4:1 (WS)	6144	2592	30.7	13.0	33.
6K 16:9 (HD)	5760	3240	28.8	16.2	33.0
6K 3:2	5760	3840	28.8	19.2	34.6
6K 4:3	5760	4320	28.8	21.6	36.0
6K 8:9	2880	3240	14.40	16.20	21.67
6K 6:5	3888	3240	19.4	16.2	25.3
6K 4:1	6144	1536	30.7	7.7	31.7
6K 8:1	6144	768	30.7	3.8	31.0
5.5K FF	5632	2948	28.2	14.7	31.8
5.5K 2:1	5632	2816	28.2	14.1	31.5
5.5K 2.4:1 (WS)	5632	2376	28.2	11.9	30.6
5.5K 16:9 (HD)	5376	3024	26.9	15.1	30.8
5.5K 4:1	5632	1408	28.2	7.0	29.0
5.5K 8:1	5632	704	28.2	3.5	28.4
5K FF	5120	2700	25.6	13.5	29.0
5K 2:1	5120	2560	25.6	12.8	28.6
5K 2.4:1 (WS)	5120	2160	25.6	10.8	27.8

RESOLUTION	DIMENSION (PIXELS)		DIMENSIONS (MM)		
	WIDTH	HEIGHT	WIDTH	HEIGHT	DIAGONAL
5K 16:9 (HD)	4800	2700	24.0	13.5	27.5
5K 4:3	5120	3840	25.60	19.20	32.00
5K 8:9	2400	2700	12.00	13.50	18.06
5K 6:5	3240	2700	16.2	13.5	21.1
5K 4:1	5120	1280	25.6	6.4	26.4
5K 8:1	5120	640	25.6	3.2	25.8
4.5K FF	4608	2412	23.0	12.1	26.0
4.5K 2:1	4608	2304	23.0	11.5	25.8
4.5K 2.4:1 (WS)	4608	1944	23.0	9.7	25.0
4.5K 16:9 (HD)	4224	2376	21.1	11.9	24.2
4.5K 3:2	4320	2880	21.6	14.4	26.0
4.5K 4:3	4320	3240	21.6	16.2	27.0
4.5K 5:4	4320	3456	21.6	17.3	27.7
4.5K 4:1	4608	1152	23.0	5.8	23.7
4.5K 8:1	4608	576	23.0	2.9	23.2
4K FF	4096	2160	20.5	10.8	23.2
4K 2:1	4096	2048	20.5	10.2	22.9
4K 2.4:1 (WS)	4096	1728	20.5	8.6	22.2
4K 16:9 (HD)	3840	2160	19.2	10.8	22.0
4K 3:2	3840	2560	19.2	12.8	23.1
4K 4:3	3840	2880	19.2	14.4	24.0
4K 5:4	3840	3072	19.2	15.4	24.6
4K 8:9	1920	2160	9.60	10.80	14.45
4K 6:5	2592	2160	13.0	10.8	16.9
4K 4:1	4096	1024	20.5	5.1	21.1
4K 8:1	4096	512	20.5	2.6	20.6
4K 1:1	4320	4320	21.6	21.6	30.5
3.5K FF	3584	1876	17.9	9.4	20.2
3.5K 2:1	3584	1792	17.9	9.0	20.0

RESOLUTION	DIMENSION (PIXELS)		DIMENSIONS (MM)		
	WIDTH	**HEIGHT**	**WIDTH**	**HEIGHT**	**DIAGONAL**
3.5K 2.4:1 (WS)	3584	1512	17.9	7.6	19.4
3.5K 16:9 (HD)	3456	1944	17.3	9.7	19.8
3.5K 3:2	3360	2240	16.8	11.2	20.2
3.5K 4:3	3360	2520	16.8	12.6	21.0
3.5K 5:4	3360	2688	16.8	13.4	21.5
3.5K 4:1	3584	896	17.9	4.5	18.5
3.5K 8:1	3584	448	17.9	2.2	18.1
3K FF	3072	1620	15.4	8.1	17.4
3K 2:1	3072	1536	15.4	7.7	17.2
3K 2.4:1 (WS)	3072	1296	15.4	6.5	16.7
3K 16:9 (HD)	2880	1620	14.4	8.1	16.5
3K 3:2	2880	1920	14.4	9.6	17.3
3K 4:3	2880	2160	14.4	10.8	18.0
3K 5:4	2880	2304	14.4	11.5	18.4
3K 6:5	1944	1620	9.7	8.1	12.7
3K 4:1	3072	768	15.4	3.8	15.8
3K 8:1	3072	384	15.4	1.9	15.5
2.5K FF	2560	1340	12.8	6.7	14.4
2.5K 2:1	2560	1280	12.8	6.4	14.3
2.5K 2.4:1 (WS)	2560	1080	12.8	5.4	13.9
2.5K 16:9 (HD)	2304	1296	11.5	6.5	13.2
2.5K 3:2	2400	1600	12.0	8.0	14.4
2.5K 4:3	2400	1800	12.0	9.0	15.0
2.5K 5:4	2400	1920	12.0	9.6	15.4
2.5K 4:1	2560	640	12.8	3.2	13.2
2.5K 8:1	2560	320	12.8	1.6	12.9
2K FF	2048	1080	10.2	5.4	11.6
2K 2:1	2048	1024	10.2	5.1	11.4
2K 2.4:1 (WS)	2048	864	10.2	4.3	11.1

RESOLUTION	DIMENSION (PIXELS)		DIMENSIONS (MM)		
	WIDTH	HEIGHT	WIDTH	HEIGHT	DIAGONAL
2K 16:9 (HD)	1920	1080	9.6	5.4	11.0
2K 3:2	1920	1280	9.6	6.4	11.5
2K 4:3	1920	1440	9.6	7.2	12.0
2K 5:4	1920	1536	9.6	7.7	12.3
2K 6:5	1296	1080	6.5	5.4	8.4
2K 4:1	2048	512	10.2	2.6	10.6
2K 8:1	2048	256	10.2	1.3	10.3

ANAMORPHIC

Select an **Anamorphic** setting, if applicable. The anamorphic setting de-squeezes the image on the monitor and marks the footage as anamorphic in the clip metadata. When you open the clip in REDCINE-X PRO, the program automatically de-squeezes the image. The available anamorphic settings depend on your camera type.

The camera supports anamorphic 1.3x and 2x with each format.

The camera also supports anamorphic 1.25x for 6K full format and 8K full format.

DE-SQUEEZED RESOLUTION AND DE-SQUEEZED ASPECT RATIO

When you enable anamorphic, both the actual format and the de-squeezed format display at the bottom of the Format menu. To view the actual format and the de-squeezed format, go to **Menu** > **Settings** > **Project** > **Format** > **Format**.

When anamorphic is enabled, the camera does not crop the sensor image, so the recorded image has the same resolution and dimensions as the corresponding non-anamorphic format.

After de-squeezing the footage in post production, the resulting footage has a different format than the original recorded image. The format of the de-squeezed footage is the second format (resolution and aspect ratio) that displays on the Format menu.

Since the camera does not crop the image, you will have additional horizontal area to frame the image. Then, crop or scale the footage to the intended aspect ratio.

SHORT-CUT TO INDUSTRY-STANDARD ANAMORPHIC FORMATS

To quickly access industry-standard anamorphic formats, go to **Menu** > **Settings** > **Project** > **Format** > **Anamorphic**. The Anamorphic tab is a short-cut to all of the industry-standard anamorphic formats, so that you can easily select the most common anamorphic formats.

The Anamorphic tab lists the anamorphic formats for every format with a 6:5, 5:4, or 4:3 aspect ratio.

NOTE: The Anamorphic tab only lists industry-standard anamorphic formats. To access all of the anamorphic and non-anamorphic formats, go to **Menu** > **Settings** > **Project** > **Format** > **Format**.

SENSOR (FLIP/MIRROR SCAN DIRECTION)

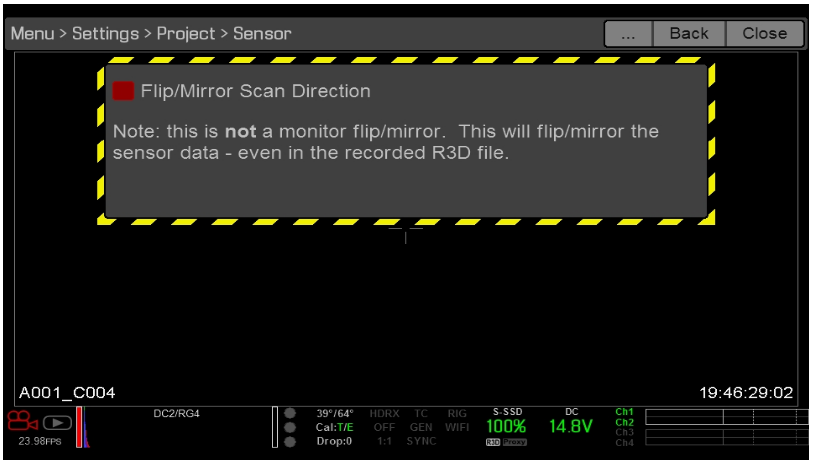
The Flip/Mirror Scan Direction feature rotates the image 180°, both on the monitor and in the recorded R3D file. Normally, the sensor scans the image from the top to the bottom. When the Flip/Mirror Scan Direction feature is enabled, the sensor scan direction reverses, and the sensor scans the image from the bottom to the top.

The Flip/Mirror Scan Direction feature is intended for multi-camera arrays when all sensors are synchronized, and at least one (1) camera is mounted upside-down. Using this feature is helpful for matching the line scan direction for the cameras in the array.

To enable the Flip/Mirror Scan Direction feature, follow the instructions below:

1. Go to **Menu** > **Settings** > **Project** > **Sensor**.
2. Select the **Flip/Mirror Scan Direction** check box.

   The camera rotates the image 180° on the monitor and in the recorded R3D file.


Menu > Settings > Project > Sensor
...
Back
Close
A001_C004
19:46:29:02
DC2/RG4
23.98FPS
39°/64°
Cal:T/E
Drop:0
HDRX
OFF
1:1
TC
GEN
SYNC
RIG
WIFI
S-SSD
100%
DC
14.8V
Ch1
Ch2
Ch3
Ch4

☐ Flip/Mirror Scan Direction

Note: this is **not** a monitor flip/mirror. This will flip/mirror the sensor data - even in the recorded R3D file.

Figure: Flip/Mirror Scan Direction

RECORDING

The Recording menu includes: Mode, Codec, Frame Processing, Pre-Record, and Indicator.

MODE

You can select the following recording modes: Continuous Record, Internal Timelapse Timer, Frame Trigger, REDCODE Burst, Speed Ramp Mode, Multi-Shot, and Motion + Stills.

NOTE: Audio is recorded only in Continuous Record and Motion + Stills modes.

STORAGE

You can select the following storage locations:

- **Local**: Stores footage directly to an SSD
- **Network**: Stores footage to a network
- **External**: Stores footage to an external device

NOTE: HDRX is disabled in Network Storage mode.

NOTE: In External storage, you can only select Continuous Record and Motion + Stills recording modes.

CONTINUOUS RECORD

NOTE: This mode is not available in Stills mode.

Continuous Record is the “normal” recording mode. The camera continuously records frames at the current recording frame rate. You can limit each recording to a specific amount of frames using the Limit Recording to setting.

INTERNAL TIMELAPSE TIMER

NOTE: This mode is not available in Stills mode.

NOTE: Audio is not recorded in Internal Timelapse Timer mode.

In Internal Timelapse Timer mode, the camera records a specified number of frames at a specified interval. The current recording frame rate determines the timing of the frames per pulse.

For example, in Internal Timelapse Timer mode, you can choose to record a total amount of 1000 frames, and take 1 frame every 4.67 seconds. After recording 1000 frames (which takes 4,670.00 seconds), the recording process stops.

To use Internal Timelapse Timer mode, follow the instructions below:

1. Go to **Menu** > **Settings** > **Recording** > **Mode**.
2. Select **Internal Timelapse Timer** from the **Mode** drop-down menu.
3. Use the **Limit Recording to** fields to set the recording to end at a predefined frame limit (optional).
4. Select the number of frames to be captured in the **Record** field.
5. Select the time interval from the **Interval** field (range is 1–3,599 sec). The Interval setting specifies the frequency at which the frame or group of frames is captured.
6. Close the menu.
7. Start recording to start the interval.

   The overlay displays the number of frames recorded out of the total amount of frames.

FRAME TRIGGER

NOTE: This mode is not available in Stills mode.

NOTE: Audio is not recorded in Frame Trigger mode.

In Frame Trigger mode, the camera records the specified number of frames for each external trigger. This mode limits the REDCODE based on sustainable record rates.

To use Frame Trigger mode, follow the instructions below:

1. Go to **Menu** > **Settings** > **Recording** > **Mode**.
2. Select **Frame Trigger** from the **Mode** drop-down menu.
3. Use the **Limit Recording to** fields to set the recording to end at a predefined frame limit (optional).
4. Select a **Pre Count** and **Post Count**. For more information, go to "Pre Count and Post Count" on the next page.
5. Close the menu.
6. Start recording.

   The overlay displays the number of frames recorded out of the total amount of frames.

SPEED RAMP MODE

NOTE: This mode is not available in Stills mode.

NOTE: Audio is not recorded in Speed Ramp mode.

Speed Ramp mode lets you program the current recording frame rate to transition to different recording frame rates during recording.

1. Go to **Menu** > **Settings** > **Recording** > **Mode**.
2. Select **Speed Ramp Mode** from the **Mode** drop-down menu.
3. Use the **Limit Recording to** fields to set the recording to end at a predefined frame limit (optional).
4. Select a ramp target:
   - **Ramp A/B/C/D**: Each ramp target is tied to a specific Target/Duration combination.
   - **Ramp Reset**: Ramp to the starting frame rate with the specified Duration.
5. Set the **Target** frame rate.
6. Set the **Duration**, which is how long it takes to transition from the current frame rate to the target frame rate.
7. Go to **Menu** > **Settings** > **Setup** > **Keys** and program a key to one of the following functions:
   - Record: Start Speed Ramp A/B/C/D
   - Record: Start Speed Ramp Reset
8. Start recording.
9. To start speed ramp, press the key that you have mapped to start the speed ramp.

   The frame rate transitions to the target frame rate during the duration you set up.

   NOTE: If using speed ramp mode, select an exposure that is valid for each ramp target frame rate. If the camera ramps to a frame rate that is incompatible with the current exposure, the exposure changes to the longest exposure possible for the frame rate.

REDCODE BURST

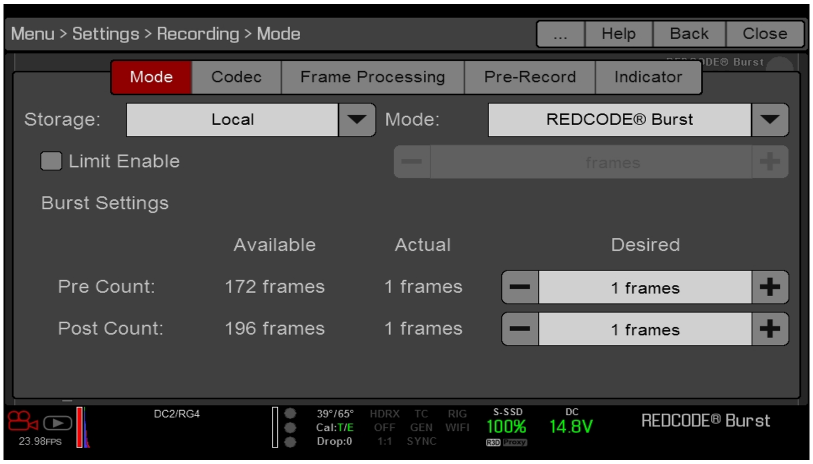
NOTE: This mode is not available in Stills mode.

NOTE: Audio is not recorded in REDCODE Burst mode.

In REDCODE Burst mode, the camera can record at a lower compression (REDCODE) for the specified amount of frames. When REDCODE Burst mode is enabled and recording starts, the camera captures a “burst” of frames at the lower REDCODE, and then continues to record at the next available REDCODE. To add more bursts to clips during recording, press any key mapped to “Record: Mark Frame”.

To use REDCODE Burst mode, follow the instructions below:

1. Go to **Menu** > **Settings** > **Recording** > **Mode**.
2. Select **REDCODE Burst** from the **Mode** drop-down menu.
3. Use the **Limit Recording to** fields to set the recording to end at a predefined frame limit (optional).
4. Select a **Pre Count** and **Post Count**. For more information, go to "Pre Count and Post Count" below.
5. Close the menu.
6. Start recording.


Menu > Settings > Recording > Mode
...
Help
Back
Close
Mode
Codec
Frame Processing
Pre-Record
Indicator
DC2/RG4
23.98FPS
39°/65°
Cal:T/E
Drop:0
HDRX
OFF
1:1
TC
GEN
SYNC
RIG
WIFI
S-SSD
100%
R3D
Proxy
DC
14.8V
REDCODE® Burst

Storage: Local

Mode: REDCODE® Burst

☐ Limit Enable

frames

Burst Settings

	Available	Actual	Desired
Pre Count:	172 frames	1 frames	1 frames
Post Count:	196 frames	1 frames	1 frames

Figure: REDCODE Burst

PRE COUNT AND POST COUNT

When Frame Trigger or Burst mode is enabled, select the number of frames for the Pre Count and Post Count:

- **Pre Count**: The camera captures the frame cache from the time preceding the marker.
- **Post Count**: The camera captures the remaining frame cache after the marker.

The maximum frame counts are listed in the Available column, and are based on format and REDCODE.

MULTI-SHOT

NOTE: The camera does not sync timecode in Multi-Shot mode.

NOTE: This mode is available in Motion mode, but is only recommended in Stills mode.

NOTE: Audio is not recorded in Multi-Shot mode.

Multi-Shot mode removes restrictions on Recording Frame Rate and REDCODE, allowing you to shoot at a high resolution, high frame rate, and low compression. These restrictions are removed because the camera records first to the camera's memory, and then offloads (while recording) to SSD after the camera's buffer fills up. Since the camera records only as fast as the buffer can transfer data, frames are dropped from the clip.

Multi-Shot mode has two sub-modes:

- Basic Multi-Shot mode
- Advanced Multi-Shot mode

BASIC MULTI-SHOT MODE

In Basic Multi-Shot mode, you can record a one-frame clip by pressing a Record key, or you can continuously record frames by holding a Record key. This mode is the easiest way to shoot stills, but there is some latency (about 700 milliseconds) when you press Record.

This mode only involves the Record key on the media bay.

Pressing the PWR/REC key on the camera initiates Advanced Multi-Shot mode.

To use Basic Multi-Shot mode, perform one of the following:

- Press a **Record** key to record a one-frame clip.
- Press and hold a **Record** key to start a new clip and continuously add frames to that clip. Release the **Record** key to stop adding frames and end the clip.

ADVANCED MULTI-SHOT MODE

In this mode, the camera is continuously recording, but is not saving frames. This eliminates the delay you get in Basic Multi-Shot mode. Since the camera is continuously recording, the camera requires the same amount of power it does during Continuous Record (as opposed to Preview mode). Unlike Basic mode, all frames are added to one (1) clip, instead of to separate clips.

To use Advanced Multi-Shot mode, follow the instructions below:

1. Press the **PWR/REC** key on the camera to start a new clip. This initial press adds one (1) frame to the clip.
2. Press the **Record** key on the media bay to add frames to the clip:
   - Press a **Record** key once to add a few frames to the clip. (The number of frames varies, and depends on the buffer.)
   - Press and hold a **Record** key to continuously add frames; release the **Record** key to stop adding frames.
3. Press the **PWR/REC** key on the camera to end the clip.

NOTE: You cannot shut down the camera until you end the clip.

ENABLE MULTI-SHOT MODE

To enable Multi-Shot mode, follow the instructions below:

1. Set the camera to Stills mode. For more information, go to "Camera Mode" on page 51.
2. Go to **Menu** > **Settings** > **Recording** > **Mode**.
3. Select **Multi-Shot** from the **Mode** drop-down menu.
4. Use the **Limit Recording to** fields to set the recording to end at a predefined frame limit (optional).
5. Close the menu.

MOTION + STILLS

NOTE: This mode is available in Motion mode, but is only recommended in Stills mode.

Motion + Stills mode is identical to Continuous Record, except that when you initiate recording by pressing the PWR/REC key on the camera, all other Record keys mark frames for the duration of the clip. (If you initiate recording by pressing any other Record key, you can press any key mapped to “Record: Mark Frame” to mark stills.)

To use Motion + Stills mode, follow the instructions below:

1. Set the camera to Stills mode. For more information, go to "Camera Mode" on page 51.
2. Go to **Menu** > **Settings** > **Recording** > **Mode**.
3. Select **Motion + Stills** from the **Mode** drop-down menu.
4. Use the **Limit Recording to** fields to set the recording to end at a predefined frame limit (optional).
5. Close the menu.
6. Press the **PWR/REC** key on the camera to start recording.
7. Press the **Record** key on the media bay to mark a frame.
8. Press the **PWR/REC** key on the camera to stop recording.

APPLE PRORES INFORMATION

By default, the camera records all videos and stills in the REDCODE RAW file format (records R3D files). You also have the option to record Apple ProRes files. This section provides general information about recording Apple ProRes files with the camera:

NOTE: If Look Around is enabled, the Look Around area is recorded in the Apple ProRes file.

- Selecting a Recording Frame Rate that is not supported by Apple ProRes has the following effects:
  - **2K Apple ProRes over 120 FPS**: The QuickTime file will be sub-sampled.
  - **4K Apple ProRes over 60 FPS**: Apple ProRes is disabled.
  - **4K Apple ProRes + R3D over 29.97 FPS**: Apple ProRes is disabled.
- The camera cannot record Apple ProRes when Pre-Record is enabled.
- The camera can record Apple ProRes only when either of the following recording modes is enabled:
  - Continuous Record
  - Motion + Stills
- Recording 4K Apple ProRes is only available:
  - When recording to Apple ProRes only
  - When recording to the following codecs:
    - Apple ProRes 422
    - Apple ProRes 422 HQ
    - Apple ProRes 422 LT
- If HDRX® is enabled, only the selected monitor track is recorded to the QuickTime files. For more information, go to "HDRX Menu" on page 117.
- RED recommends performing a Secure Format before recording Apple ProRes. For more information, see the DSMC Media Operation Guide, available at www.red.com/downloads.
- QuickTime files have the same metadata that is in the REDCODE RAW files. The metadata is per clip, and not per frame. At this time, there is no tool for extracting that metadata from the QuickTime files.
- You can select any resolution. When recording Apple ProRes, the camera scales that format to the Resolution (2K) selected in the Codec menu. The field of view is maintained in the QuickTime file; the image is not cropped.
- If recording 4K Apple ProRes and the Resolution is less than 4K, the image is scaled to 2K.
- For more information about Apple ProRes, including the data rates for each codec, see the Apple Support site.
- To record Apple ProRes files, go to "Select Record File Format" on page 114.

APPLE PRORES DESCRIPTION

The table below describes each supported Apple ProRes codec.

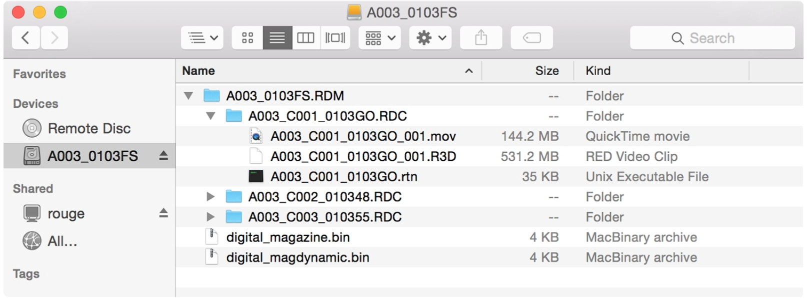
NAME	CHROMA SAMPLING
ProRes 422 HQ	YCbCr 4:2:2
ProRes 422	YCbCr 4:2:2
ProRes 422 LT	YCbCr 4:2:2
ProRes 4444 XQ	YCbCr 4:4:4
ProRes 4444	YCbCr 4:4:4

FILE STRUCTURE OF RECORDED APPLE PRORES FILES

When recording R3D + Apple ProRes, this is the file structure of the recorded files on the SSD (when the SSD is formatted as FAT32):

- .RDM Folder
  - .RDC Folder
    - .mov
    - .R3D
    - .rtn (RED Thumbnail file)

NOTE: The camera creates multiple .mov files, similar to how the camera creates multiple R3D files.


A003_0103FS
Search
Favorites
Devices
Remote Disc
A003_0103FS
Shared
rouge
All...
Tags

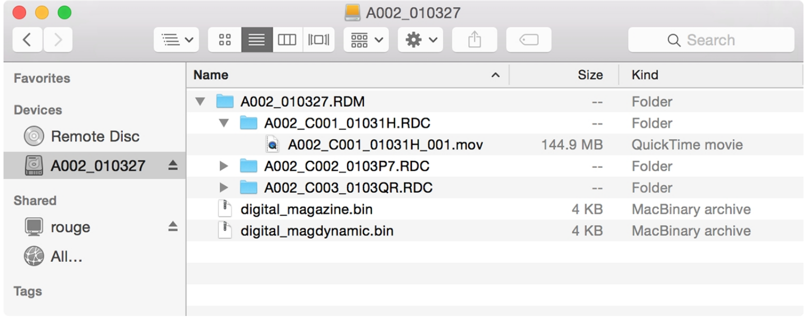
Name	Size	Kind
A003_0103FS.RDM	--	Folder
A003_C001_0103GO.RDC	--	Folder
A003_C001_0103GO_001.mov	144.2 MB	QuickTime movie
A003_C001_0103GO_001.R3D	531.2 MB	RED Video Clip
A003_C001_0103GO.rtn	35 KB	Unix Executable File
A003_C002_010348.RDC	--	Folder
A003_C003_010355.RDC	--	Folder
digital_magazine.bin	4 KB	MacBinary archive
digital_magdynamic.bin	4 KB	MacBinary archive

Figure: File Structure: R3D + Apple ProRes

When recording Apple ProRes only, this is the file structure of the recorded files on the SSD (when the SSD is formatted as FAT32):

- .RDM Folder
  - .RDC Folder
    - .mov

NOTE: The camera creates multiple .mov files, similar to how the camera creates multiple R3D files.


A002_010327
Search
Favorites
Devices
Remote Disc
A002_010327
Shared
rouge
All...
Tags

Name	Size	Kind
A002_010327.RDM	--	Folder
A002_C001_01031H.RDC	--	Folder
A002_C001_01031H_001.mov	144.9 MB	QuickTime movie
A002_C002_0103P7.RDC	--	Folder
A002_C003_0103QR.RDC	--	Folder
digital_magazine.bin	4 KB	MacBinary archive
digital_magdynamic.bin	4 KB	MacBinary archive

Figure: File Structure: Apple ProRes

AVID DNXHD AND AVID DNXHR INFORMATION

By default, the camera records all videos and stills in the REDCODE RAW file format (records R3D files). You also have the option to record to Avid DNxHD and Avid DNxHR (records .mxf files). This section provides general information about recording Avid DNxHD/HR with the camera:

NOTE: If Look Around is enabled, the Look Around area is recorded in the Avid DNxHD/HR file.

NOTE: Enabling Look Around effects the aspect ratio of the scaled file, regardless of the recorded area.

- Selecting a Recording Frame Rate that is not supported by Avid DNxHD/HR causes the codec file to be sub-sampled to half of the selected Recording Frame Rate.
- The camera cannot record Avid DNxHD/HR when Pre-Record is enabled.
- The camera can record Avid DNxHD/HR only when either of the following recording modes is enabled:
  - Continuous Record
  - Motion + Stills
- If HDRX® is enabled, only the selected monitor track is recorded to the Avid DNxHD/HR file. For more information, go to "HDRX Menu" on page 117
- RED recommends performing a Secure Format before recording Avid DNxHD/HR. For more information, see the DSMC Media Operation Guide, available at www.red.com/downloads.
- The .mxf files have the same metadata that is in the REDCODE RAW files. The metadata is per clip, and not per frame. At this time, there is no tool for extracting that metadata from the .mxf files.
- You can select any resolution. When recording Avid DNxHD/HR, the camera scales that format to the Resolution (2K or 4K) selected in the Codec menu. The field of view is maintained in Avid DNxHD/HR; the image is not cropped.
- If recording 4K Avid DNxHD/HR and the Resolution is less than 4K, the image is scaled to 2K.
- For more information about Avid DNxHD/HR, see the Avid site.
- To record Avid DNxHD/HR, go to "Select Record File Format" on page 114.

AVID DNXHD AND AVID DNXHR DESCRIPTION

The table below describes each Avid DNxHD/HR codec.

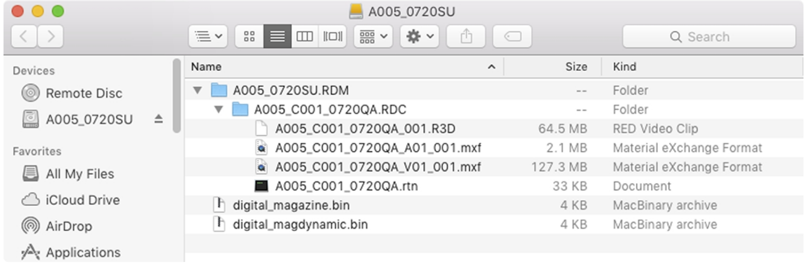
NAME	CODEC ID	MAXIMUM BITS	COLOR
DNxHR HQX	1271	12 bit	YCbCr 4:2:2
DNxHR HQ	1272	8 bit	YCbCr 4:2:2
DNxHR SQ	1273	8 bit	YCbCr 4:2:2
DNxHR 444	1270	12 bit	RGB 4:4:4
DNxHD 444	1256	10 bit	RGB 4:4:4
DNxHD HQX	1235	10 bit	YCbCr 4:2:2
DNxHD HQ	1238	8 bit	YCbCr 4:2:2
DNxHD SQ	1237	8 bit	YCbCr 4:2:2

FILE STRUCTURE OF RECORDED AVID CODEC FILES

When recording R3D + Avid DNxHD/HR, this is the file structure of the recorded files on the SSD (when the SSD is formatted as FAT32):

- .RDM Folder
    - .RDC Folder
        - .R3D
        - .mxf (audio file, marked with an "A")
        - .mxf (video file, marked with a "V")
        - .rtn (RED Thumbnail file)

NOTE: The camera creates multiple .mxf files, similar to how the camera creates multiple R3D files.


A005_0720SU
Search
Devices
Remote Disc
A005_0720SU
Favorites
All My Files
iCloud Drive
AirDrop
Applications

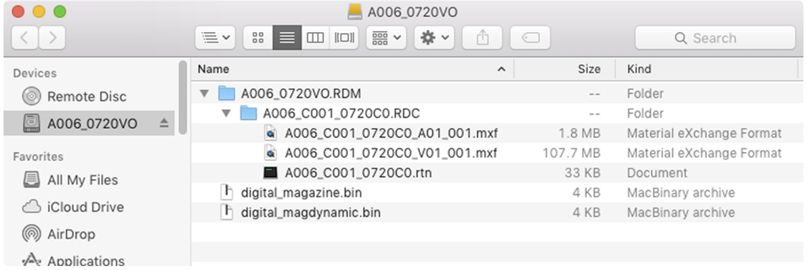
Name	Size	Kind
A005_0720SU.RDM	--	Folder
A005_C001_0720QA.RDC	--	Folder
A005_C001_0720QA_001.R3D	64.5 MB	RED Video Clip
A005_C001_0720QA_A01_001.mxf	2.1 MB	Material eXchange Format
A005_C001_0720QA_V01_001.mxf	127.3 MB	Material eXchange Format
A005_C001_0720QA.rtn	33 KB	Document
digital_magazine.bin	4 KB	MacBinary archive
digital_magdynamic.bin	4 KB	MacBinary archive

Figure: File Structure: R3D + DNxHD/HR

When recording Avid DNxHD/HR only, this is the file structure of the recorded files on the SSD (when the SSD is formatted as FAT32):

- .RDM Folder
    - .RDC Folder
        - .mxf (audio file, marked with an "A")
        - .mxf (video file, marked with a "V")
        - .rtn (RED Thumbnail file)

NOTE: The camera creates multiple files, similar to how the camera creates multiple R3D files.


A006_0720VO
Search
Devices
Remote Disc
A006_0720VO
Favorites
All My Files
iCloud Drive
AirDrop
Applications

Name	Size	Kind
A006_0720VO.RDM	--	Folder
A006_C001_0720C0.RDC	--	Folder
A006_C001_0720C0_A01_001.mxf	1.8 MB	Material eXchange Format
A006_C001_0720C0_V01_001.mxf	107.7 MB	Material eXchange Format
A006_C001_0720C0.rtn	33 KB	Document
digital_magazine.bin	4 KB	MacBinary archive
digital_magdynamic.bin	4 KB	MacBinary archive

Figure: File Structure: R3D + DNxHD/HR

SELECT RECORD FILE FORMAT

NOTE: For more information on which codecs your camera offers, go to "Technical Specifications" on page 178.

To select what file formats to record to, follow the instructions below.

1. Go to **Menu** > **Settings** > **Recording** > **Codec**.
2. Select the file format(s) you want to record to from the **Record File Format** drop-down menu:
    - R3D
    - R3D + Apple ProRes
    - R3D + Avid DNxHD/HR
    - Apple ProRes
    - Avid DNxHD/HR

    The selected file format displays in the Lower Status Row.
3. **R3D**: Select a target REDCODE compression ratio from the **REDCODE** menu. For more information, go to "REDCODE" on page 47.
4. **Apple ProRes or Avid DNxHD/HR:** Select a resolution from the **Resolution** drop-down menu.
5. **Apple ProRes or Avid DNxHD/HR**: Select a codec from the **Record Video Codec** drop-down menu.
6. **Apple ProRes or Avid DNxHD/HR**: If the camera is in IPP2 mode, select an option from the **Baked-in Settings** drop-down menu. This determines which image settings are irreversibly encoded (baked) as image data in the recorded file. For more information on the options in this menu, go to "Baked-In Settings" below.

    NOTE: Although the "All Image Settings" is an option when 4K is selected within the Resolution drop-down menu, this option can only be applied with 2K output. If 4K and "All Image Settings" are selected at the same time, the Baked-in Settings turns red and yellow as a warning, and the settings are NOT applied.

BAKED-IN SETTINGS

If the camera is in IPP2 mode and you are recording to a 2K Apple ProRes or 2K Avid DNxHD/HR codec, you can irreversibly encode (bake) certain image settings into the recorded file. To bake in settings, select one of the following options from the **Baked-in Settings** drop-down menu:

- **Primary Only**: Only bakes the ISO, Color Temperature, Tint, and Exposure Adjust settings into the recorded file. Does NOT bake in the 3D LUT and other image settings.
- **All Image Settings**: Bakes all image settings into the recorded file, including the Primary Raw Development, Grading, and Output Transform stages. This includes the 3D LUT, CDLs, and output color space. For more information on the different IPP2 stages, see the IPP2: Image Pipeline Stages white paper at www.red.com/downloads. With the All Image Settings option, you can select either SDR or HDR to control the tone curve for standard dynamic range (SDR) or high dynamic range (HDR) output.

FRAME PROCESSING

NOTE: Frame processing is not supported in Speed Ramp Mode. For more information, go to "Speed Ramp Mode" on page 106.

NOTE: For cameras with the MONSTRO sensor, frame processing is disabled for formats larger than 7680 x 4320.

Frame processing allows for the combination of multiple captured frames into one recorded frame. The combination occurs before the resulting frame is encoded. You can select the following frame processing settings: No Frame Processing, Frame Summing, Frame Averaging.

When in Frame Summing mode or Frame Averaging mode, the current integration time is applied to each frame. This means if the integration time is not the entire frame time (or 360°) there are gaps between the images used to create the combined frame. This may lead to unexpected motion artifacts.

The effect of frame processing is only visible during record. In Frame Summing mode, this means the exposure changes between preview and record. Experiment with the exposure and frame processing settings to achieve the effect you want.

NO FRAME PROCESSING

Normal frame processing mode. The Frames to Process selection does not affect recording.

FRAME SUMMING

Frame Summing combines the specified number of frames into one frame, and adds together the exposure time for each of the original frames. The resulting frame has an effective integration time that is equal to the current integration time multiplied by the number of frames.

For example, if you select 16 as the Frames to Process value, and set exposure to 1/48 sec, the resulting image has an effective integration time of 1/3 sec (16 x 1/48).

Frame summing results in a final image that is brighter and possibly blurrier than any of the original frames, so you can use frame summing to achieve the effect of long-exposure.

FRAME AVERAGING

Frame Averaging combines the specified number of frames into one frame, and averages the exposure time for each of the original frames. The resulting frame has an effective integration time that is equal to the current integration time.

For example, if you select 2 as the Frames to Process value, and set exposure to 1/48 sec, the resulting image still has the exposure value of 1/48 sec, along with the effect of long-exposure.

You can use frame averaging to achieve the effect of long-exposure along with the benefits of reduced noise. However, frame averaging does affect motion blur characteristics.

NOTE: For RED cameras with 8K sensors, a maximum of 2 frames can be averaged.

PRE-RECORD

To set up Pre-Record, go to **Menu** > **Settings** > **Recording** > **Pre-Record**.

When enabled, the Pre-Record setting continuously captures a cache of footage before recording starts. Select to have 4 to 30 seconds (incremented at two second intervals) of pre-record time added to the actual footage. When Pre-Record is enabled, you will not miss the start of a shot by being a little slow on the trigger.

- **Pre-Record Duration**: Select the pre-record time.
- **Always trigger Pre-Record before recording**: When selected, Pre-Record always starts when recording starts:
  - Press **PWR/REC** to activate Pre-Record.
  - Press **PWR/REC** a second time to start recording.
  - Press **PWR/REC** a third time to stop recording.
- **Trigger Pre-Record Now**: When selected, the Pre-Record menu closes and Pre-Record mode starts.

NOTE: Always perform a Secure Format before using Pre-Record. A Secure Format restores the SSD back to factory out-of-box settings, and optimizes the SSD for Pre-Record.

NOTE: Pre-Record puts your SSD in a state of constant record. As with any SSD technology, continuously writing data over an extended period of time will impact the lifespan of the media.

NOTE: To use Pre-Record only for specific situations, map Pre-Record to a key (**Menu** > **Settings** > **Setup** > **Keys** > **Record: Start Pre-Record**). For more information, go to "Keys" on page 122.

INDICATOR

- **Enable Sounds**: Select this check box to enable sounds. Then select sounds for the following actions:
  - Record Start
  - Record Stop
  - Tag Still Frame
- **EVF Tally Light**: Enable the EVF Record Tally LED on the EVF to illuminate red when recording.
- **SSD Tally Light**: Enable the Record Tally LED on the media bay to illuminate red when recording.

HDRX MENU

NOTE: HDRX mode cannot be modified when test signals are enabled.

NOTE: You cannot change the exposure when HDRX is enabled.

In HDRx mode, the camera records two (2) exposures within the interval that it would usually record only one (1). The primary exposure is normal, and uses the standard aperture and shutter settings (the “A track”). The secondary exposure is typically for highlight protection, and uses an adjustable shutter speed that is 2 to 6 stops faster (the “X track”). Since the camera captures twice the usual amount of frames, the maximum available recording frame rate is halved and the REDCODE compression options are limited.

For more information, see the High Dynamic Range Video with HDRX article, available at www.red.com/learn/red-101/hdrx-high-dynamic-range-video.

HDRX RESTRICTIONS

You cannot use HDRX mode when:

- A Sensor Sync Mode (Genlock) is enabled.
- Speed Ramp mode is enabled.
- A Frame Processing mode (Frame Summing or Frame Averaging) is enabled.
- Network Storage mode is enabled.

ENABLE HDRX

By default HDRX is disabled, and the HDRX indicator in the Lower Status Row is grey.

To enable HDRX, follow the instructions below:

1. Go to **Menu** > **Settings** > **HDRX**.
2. Select **HDRX**.

   The HDRX text in the Lower Status Row turns white.
3. Select the number of **Factors**. The range is 1 to 6, and the default is 2.
4. Select which track you want the display to show:
   - **A Track**: This track shows the video with the selected aperture and exposure settings applied.
   - **X Track**: This track shows the video with the additional stops applied.

FOCUS MENU

To access the Focus menu, go to **Menu** > **Settings** > **Focus**.

The Focus menu includes: Mode and Rack.

MODE TAB

Use the Mode tab to select a focus setting. To set up focus, follow the instructions below:

1. Go to **Menu** > **Settings** > **Focus** > **Mode**.
2. Select a mode from the **Mode** drop-down menu. For more information, go to "Mode" below.
3. Select a zone/target from the **Zone** drop-down menu. For more information, go to "Zone/Target" below.
4. If using Spot, select a size from the **Size** drop-down menu. For more information, go to "Size" below.
5. Select a confirm style from the **Confirm** menu. For more information, go to "Confirm Style" below.

MODE

Select an option from the **Mode** drop-down menu:

- **Manual**: Enables manual focus. Disables all other settings in the Focus menu.
- **Confirm**: Enables a focus target, which changes color to indicate if the subject in the target is in focus. After selecting Confirm, set up the target type (zone), size, and confirm style. Inadequate lighting and/or contrast may decrease the performance of Confirm mode.

ZONE/TARGET

Select an option from the **Zone** drop-down menu:

- **Center**: A large square centered in the recording area.
- **Spot**: A small target for precise focus that you can move around the recording area. Select a size for the target from the **Size** drop-down menu. For information on how to move the Spot target, go to "Move the Spot Focus Target" on the next page.

SIZE

Select a size for the Spot target from the **Size** drop-down menu.

CONFIRM STYLE

Select a confirm style from the **Confirm Style** drop-down menu.

STYLE	DESCRIPTION	OBJECT IN FOCUS	OBJECT OUT OF FOCUS
None	Square target	Target is yellow or green	Target is red
Circle	Yellow circle around a square target	Target is yellow or green; circle is almost the same size as the square	Target is red; circle gets bigger
Bar	Bar target	Target is yellow or green; vertical bar on the right side is filled up	Target is red; vertical bar on the left side is almost empty
Pie	Pie target	Target is yellow or green; line around the curve is filled up	Target is red; line around the curve is almost empty

TARGET COLOR

Both the Center and Spot targets change color to indicate if the objects in the target are in focus.

- **Blue**: Camera is focusing
- **Red**: Objects are out of focus
- **Yellow**: Objects are almost in focus
- **Green**: Objects are in focus

MOVE THE SPOT FOCUS TARGET

Move the Spot target with a touchscreen:

- Tap and hold the touchscreen on the location where you want to relocate the Spot target.
- Tap and hold the touchscreen where the Spot target currently is, and drag the Spot target.

EXPOSURE ASSIST MENU

To access the Exposure Assist menu, go to **Menu** > **Settings** > **Exposure Assist**.

The Exposure Assist menu provides access to settings for the Auto Exposure (AE) feature. The AE feature maintains a constant image brightness, even if the actual scene brightness changes.

The AE feature is different than traditional AE, in that RED AE only controls the amount of light that hits the sensor, either by adjusting aperture or exposure. RED AE analyzes RAW data before the ISO curve, and ensures that the sensor matches the user-selected brightness.

AUTO EXPOSURE MODES

The Exposure Assist modes determine when the AE tools go into effect:

- **Off**: The AE tools are not enabled.
- **Single Shot**: Map one of the following actions to trigger the AE tools:
  - AE: Start
  - AE/AF: Start
- **Continuous in Preview**: The AE tools are enabled in preview only.
- **Continuous in Preview/Record**: The AE tools are enabled in both preview and record.

NOTE: In Stills mode, AE/AF: Start is mapped to Record Half Press by default. For more information, go to "Default Key Functions" on page 210.

EXPOSURE PRIORITY

- **Manual**: You have full control of aperture and shutter. (Default)
- **Auto**: The camera sets the aperture and shutter to meet the selected exposure.
- **Av (Aperture Value)**: You set the aperture, and then the camera sets the shutter to meet the selected exposure.
- **Tv (Time Value)**: You set the shutter, and then the camera sets the aperture to meet the selected exposure.

EXP COMP AND EV SHIFT

Use the **Exp Comp** (Exposure Compensation) slider and the **EV Shift** setting to adjust the brightness of the image. The default setting of zero (0) attempts to match the average brightness on an 18% grey-target. When AE is enabled, the target and current measured brightness for the selected metering area display in the histogram as a grey and white line, respectively.

You can also map these actions to user keys:

- **AE: Decrease EV Offset**: Reduces the EV Offset in increments of 0.2.
- **AE: Increase EV Offset**: Increases the EV Offset in increments of 0.2.

METERING MODE

Metering determines the area of the sensor that is used for brightness evaluation:

- **Spot**: Weights the measurement to the center 5% of the sensor, approximately.
- **Center**: Weights the measurement to the center 25% of the sensor, approximately.
- **Average**: Averages the entire image area of the sensor.

SPEED

The Speed setting determines how quickly the algorithm adapts to changing light.

- **Slow**: Settings adapt in small steps. Use this setting for fewer and gradual adjustments.
- **Normal**: Settings adapt in medium steps.
- **Fast**: Settings adapt in large steps.

SELECTION

The Selection setting determines which values the algorithm uses. This enables you to modify the list of values so that the algorithm selects only specific parameters. Use **Free Value Selection** to improve accuracy.

For example, you can modify the aperture list to include f/2.8 and f/5.6. If Free Value Selection is enabled, the algorithm only selects aperture parameters between f/2.8 and f/5.6. This setting limits the range of focal depth.

AE INDICATORS

When the AE feature is able to match the sensor brightness, the overlay turns yellow. If the brightness fluctuates more than half of a stop, the overlay turns red.

When AE is enabled, the “AE” indicator displays before the aperture and exposure parameters in the Upper Status Row. The user-selected brightness and current measured brightness display in the histogram as grey and white lines, respectively.

AE LIMITS

All limits, includes custom modifications made to available menu items, are taken into account when AE is active. For example, if you modify the available list of exposure values, only those values are considered.

SETUP

The Setup menu includes: Keys, Date/Time, Communication, GPIO/Sync, Fan Control, Lens, and Motor Control.

KEYS

Map keys to often-used actions to easily control the camera. For a full list of the default key mappings, go to "Default Key Functions" on page 210.

KEY MAPPING

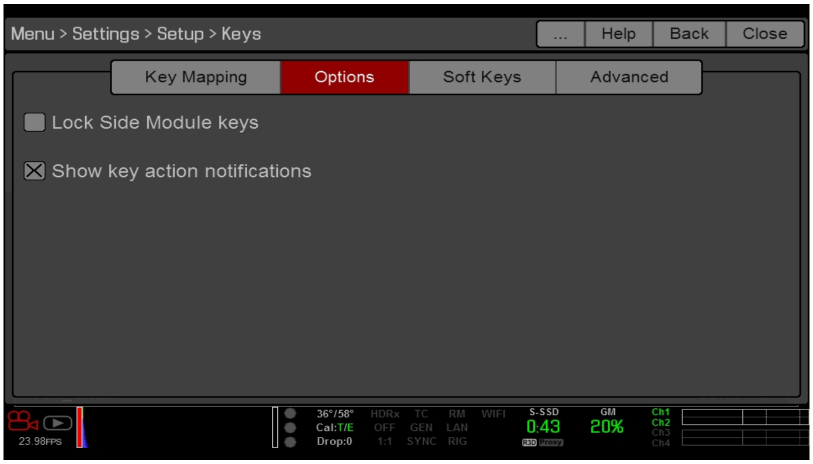
To map or remap a user key:

1. Press the user key that you want to map.
2. Select an action from the **Press** (or **CCW**) drop-down menu that you want to map to the user key.
3. To un-map a key, select **-Key Disabled-** from the drop-down menu.
4. If you want, map a **Release** or (**CW**) action to the key.

   A Release action occurs when a pressed key is released.

OPTIONS

- **Lock Side Module keys**
- **Show key action notifications**: A notification displays on the bottom of the display when you perform an action mapped to a key.


Menu > Settings > Setup > Keys
...
Help
Back
Close
Key Mapping
Options
Soft Keys
Advanced
23.98FPS
36°/58°
Cal:T/E
Drop:0
HDRx OFF 1:1
TC GEN SYNC
RM LAN RIG
WIFI
S-SSD
0:43
GM
20%
Ch1
Ch2
Ch3
Ch4

☐ Lock Side Module keys

☒ Show key action notifications

Figure: Key Options

SOFT KEYS

The following sets of soft keys are available on the touchscreen:

- **A, B, C, D**: Left side of the touchscreen
- **1, 2, 3, 4**: Right side of the touchscreen

To map or remap a soft key, select an action from the drop-down menu next to the key you want to map.

- **Enable Soft Keys on touchscreen**: Tap the left or right side of the touchscreen to show the soft keys.
- **Show key actions as labels**: When the soft keys display, the number/letter of the key and the key action display.

ADVANCED

Use the Advanced tab to map any key, even if the key is not currently accessible.

WARNING: It is possible to remap the navigation keys using this tab. However, if you do not have a touchscreen attached, it is possible to lock out control. Be careful when remapping navigation keys.

DATE/TIME

Use the Date/Time menu to reset the internal clock of the camera. The time and date are timestamps on R3D® files when recording to an SSD. The camera uses the 24-hour clock convention (military time). For example, enter 2:35 p.m. as 14:35:00.

The date and time are saved when you close the Date/Time menu.

COMMUNICATION

Use the Communication menu to allow one (1) or more cameras to communicate with each other or external devices.

You can use the serial port or a direct Ethernet cable to connect two (2) cameras, or one (1) camera and one (1) external device. If the camera is connected via Ethernet to a hub or router, multiple cameras and devices can communicate with each other.

For example, on a multi-rig 3D shoot, you can send commands to an individual camera (Example: Set CAM_A_L to 1/48 exposure), to a group of cameras (Example: Set 3DRIG_A to 48 fps), or to all cameras (Example: Start Recording on all cameras).

CAMERA

To access the Camera menu, go to **Menu** > **Settings** > **Setup** > **Communication**.

Use the Camera menu to set up a unique identifier for your camera (or a group of cameras). All command filtering happens on the receiver side of the communication link. Use camera names and group names to address commands to a specific camera or group of networked cameras.

- **Camera ID**: Enter a unique camera name to use in network communications. The field is limited to eight (8) characters.
- **Group ID**: Enter a group name to identify the camera as a member of a group of devices. The field is limited to eight (8) characters, and the default name is DEFAULT.
- **Target**: Specify which devices the camera can send commands to:
  - **All**: The camera can send commands to all devices on the network.
  - **None**: The camera can only receive commands. The camera cannot send commands.
  - **Custom**: The camera can send commands to a specific camera/device (enter the name of the camera/device in the Target ID text box) or a specific group (enter the name of the group in the Target ID text box). The camera/group name must match the name entered in the Camera/Group field of the target device(s).

SERIAL

To access the Serial menu, go to **Menu** > **Settings** > **Setup** > **Communication** > **Serial**.

The camera can communicate to external devices via the CTRL and the GIG-E connectors (camera-to-camera communication is possible only via GIG-E).

Select one of the following protocols from the **Serial Protocol** drop-down menu:

- None (Default)
- Element Technica
- 3ality SPC 7XXX
- RED Command Protocol

ETHERNET

To set up the Ethernet settings, go to **Menu** > **Settings** > **Setup** > **Communication** > **Ethernet**.

Each camera or device requires a unique IP address. For camera-to-camera communication via Ethernet, both cameras need to be in the same sub-net (have the same netmask address) and have the same gateway address.

- **Enable DHCP**: Enables DHCP. If a DHCP-server is available in the communications network, the camera obtains an IP address, netmask address, and gateway address automatically from the DHCP server. You cannot manually enter anything in the IP Address, Netmask, and Gateway fields when this check box is selected.
- **Enable Camera to Camera**: A change to settings on this camera is sent to other cameras via the network as a SET command (as UDP packets). The SET command then sets the property on other cameras. If this camera receives a SET command, the camera does not send the command to other cameras/devices.
- **Enable External Control**: This camera can be controlled via TCP/IP from an external device.

WIRELESS CONNECTION

The camera offers a wireless (802.11g) connection that provides communication support for third-party applications. The camera uses the RED Command Protocol (R.C.P.) to communicate information between the camera and an application. As with all wireless devices, the communication range may be affected by the environment and any radio frequency (RF) interference that may be present. The wireless frequency is 2.4 GHz. For optimal performance, do not obstruct the antenna with any accessory, mounting plate, or mounting rail.

There are two (2) ways to connect the camera to a device:

- **Ad-Hoc mode**: The camera and your device connect to each other.
- **Infrastructure mode**: The camera and your device both connect to an access point, and communicate through that wireless network.

NOTE: To connect the camera to an app, the app must have been programmed using the R.C.P. SDK, which is available through the R.C.P. Development Kit.

CONNECT WIRELESSLY TO A DEVICE VIA AD-HOC MODE

In Ad-Hoc mode, the camera and your device connect to each other. To connect the camera to your device via an ad-hoc network, follow the instructions below:

1. Go to **Menu** > **Settings** > **Setup** > **Communication**.
2. Select the **WiFi** tab.
3. Select **Ad-Hoc** from the **Mode** menu.
4. Select a wireless channel from the **Channel** drop-down menu. The default is Ch1, and you can select one out of 11 channels.
5. Select a security option from the **Encryption** drop-down menu:
   - **NONE**: The connection will be unsecured.
   - **WPA2**: The connection will be encrypted via WPA2.
6. If you selected WPA2 as the encryption option, type the passphrase that will be required to access the network.
7. Close the WiFi screen.
8. Connect your device to the ad-hoc network created by the camera. The steps in this procedure depend on what type of device and operating system you are using. For example, if you are connecting an iOS device, go to **Settings** > **Wi-Fi** > **Devices**, and select the camera name.

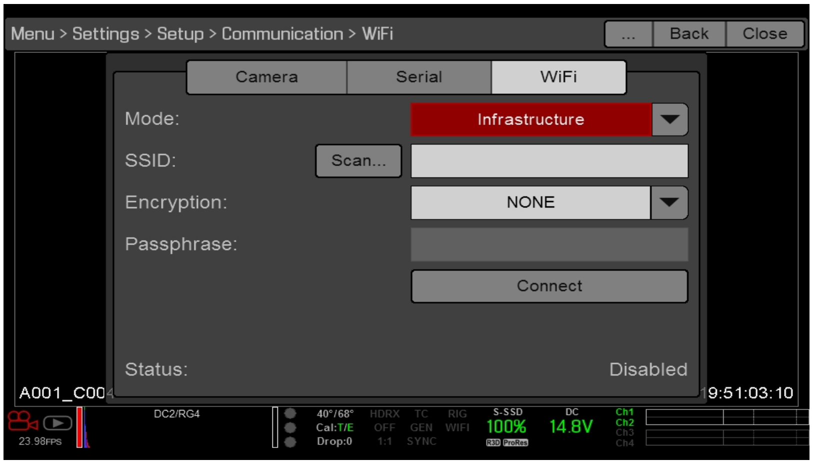
   The camera name displays on the WiFi screen in-camera. The camera and your device are now connected.

   NOTE: If you created a passphrase for the network, you will need to enter that passphrase.

CONNECT WIRELESSLY TO A DEVICE VIA INFRASTRUCTURE MODE

In Infrastructure mode, the camera and your device both connect to an access point, and communicate through that wireless network. The camera can connect to access points that are not encrypted, use WPA encryption, or use WPA2 encryption. To connect the camera to your device via an existing wireless network, follow the instructions below:

1. Connect your device to a wireless network. The access point for the network must have DHCP enabled.
2. Make sure that you know the name and password for the network, since you will need that information to connect the camera to the same network.
3. Go to **Menu** > **Settings** > **Setup** > **Communication**.
4. Select the **WiFi** tab.
5. Select **Infrastructure** from the **Mode** menu.



Mode: Infrastructure

SSID:

Encryption: NONE

Passphrase:

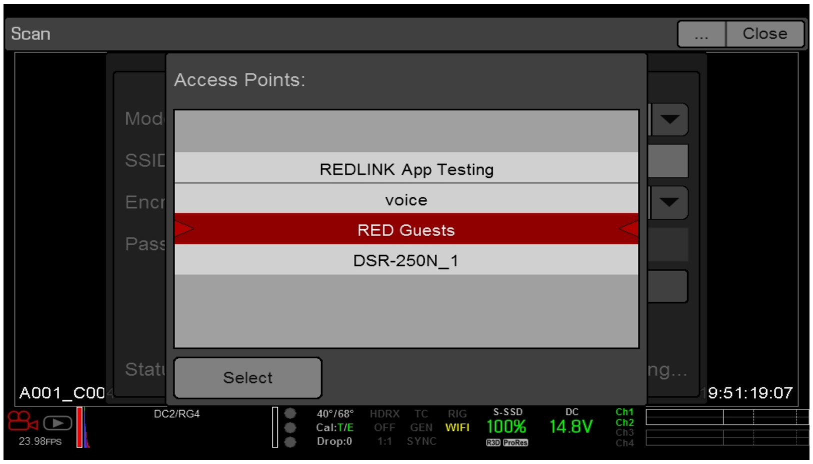
Status: Disabled

Figure: WiFi Menu

6. Select **Scan** to search for available wireless networks.

   The available wireless networks (access points) display.

7. Highlight the wireless network that your device is connected to and select **Select**.

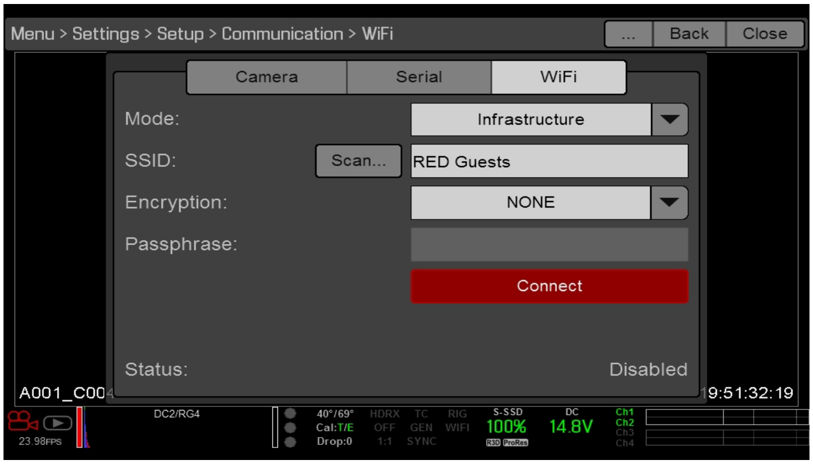

Scan
...
Close
Select
A001_C00
9:51:19:07
DC2/RG4
23.98FPS
S-SSD
100%
DC
14.8V
WIFI

Access Points:
REDLINK App Testing
voice
RED Guests
DSR-250N_1

Figure: Select Wireless Network

8. If you select an encrypted network, follow the instructions below to enter the passphrase for the network:
   A. Select a security option from the **Encryption** drop-down menu.
   B. Tap or select the **Passphrase** text box.
   C. Type the passphrase to access the network.
   D. Select **OK**.
9. To enable/disable DHCP, select **IP Config** and set up the IP settings. For more information on configuring DHCP and IP settings, go to "Ethernet" on page 124.
10. Select **Connect** at the bottom of the WiFi screen.

    The IP address of the access point displays at the bottom of the WiFi screen after the camera connects to the access point.

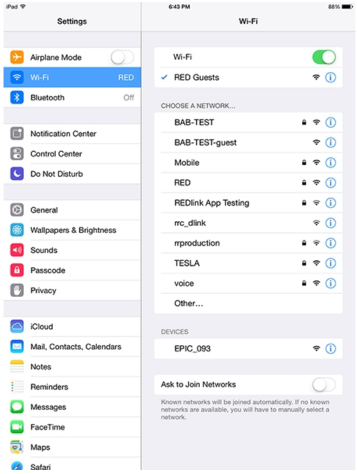

Menu > Settings > Setup > Communication > WiFi
...
Back
Close
Camera
Serial
WiFi
Scan...
Connect
A001_C00
9:51:32:19
DC2/RG4
23.98FPS
S-SSD
100%
DC
14.8V

Mode: Infrastructure
SSID: RED Guests
Encryption: NONE
Passphrase:
Status: Disabled

Figure: Select Connect

11. Connect your device to the same wireless network that the camera is connected to. The steps in this procedure depend on what type of device and operating system you are using. For example, if you are connecting an iOS device, go to **Settings** > **Wi-Fi**, and select the wireless network.

    The camera and your device are now connected.

    
iPad
6:43 PM
88%
Settings
Wi-Fi
Airplane Mode
Wi-Fi RED
Bluetooth Off
Notification Center
Control Center
Do Not Disturb
General
Wallpapers & Brightness
Sounds
Passcode
Privacy
iCloud
Mail, Contacts, Calendars
Notes
Reminders
Messages
FaceTime
Maps
Safari
Wi-Fi
✓ RED Guests
CHOOSE A NETWORK...
BAB-TEST
BAB-TEST-guest
Mobile
RED
REDlink App Testing
rrc_dlink
rrproduction
TESLA
voice
Other...
DEVICES
EPIC_093
Ask to Join Networks

    Known networks will be joined automatically. If no known networks are available, you will have to manually select a network.

    Figure: Connect to Network

12. To ensure that your app can communicate with the camera, ensure that there is a way to connect your app to a specific camera. Since there may be multiple cameras in the area, select your specific camera in the app itself.

GPIO SYNC

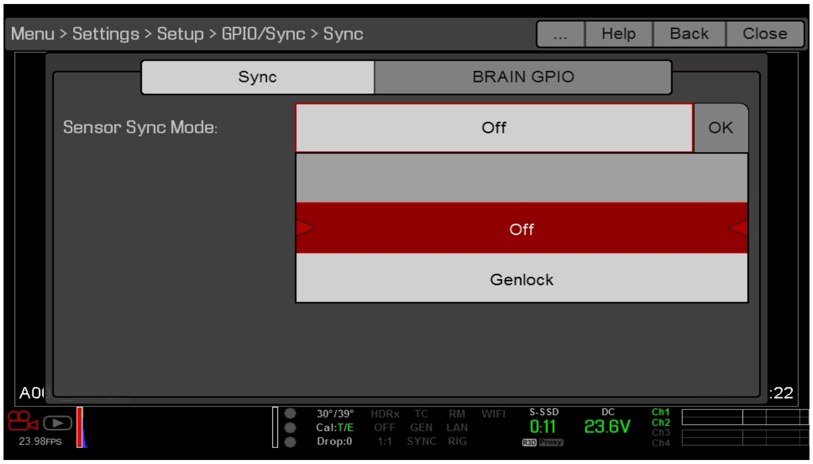
SYNC

Use the Sync menu to set up genlock. For more information, go to "Timecode, Genlock, Multi-Camera Setup" on page 149.

SENSOR SYNC MODE

Sensor Sync Mode allows the shutter timing (scan start) to sync to an external signal.

- **Off**: Sensor runs at the current recording frame rate. This is the default option.
- **Genlock**: Sensor synchronizes with the incoming compatible genlock signal.



Menu > Settings > Setup > GPIO/Sync > Sync

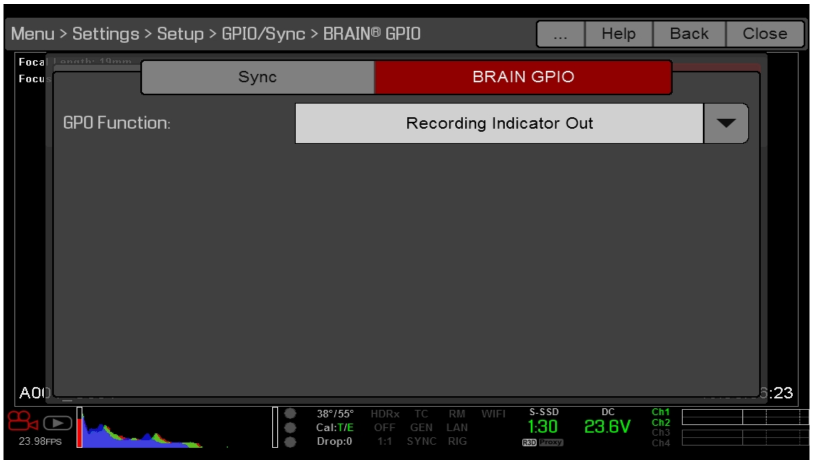
Sensor Sync Mode: Off

...
Help
Back
Close
Sync
BRAIN GPIO
OK
Off
Genlock
23.98FPS
S-SSD
0:11
DC
23.6V

Figure: Sync Menu

BRAIN GPIO

- **GPO Function (Camera Output)**: Select an option to configure the output for devices connected to the CTRL connector on the camera:
  - **Sync Out**: Provides an output sync signal to act as a shutter start tally.
  - **Recording Indicator Out**: Provides a signal when recording is in process.


Menu > Settings > Setup > GPIO/Sync > BRAIN® GPIO
...
Help
Back
Close
Sync
BRAIN GPIO
23.98FPS
S-SSD
1:30
DC
23.6V

GPO Function: Recording Indicator Out

Figure: BRAIN GPIO Menu

GEN AND SYNC STATUS INDICATORS

The Lower Status Row of the camera display has GEN and SYNC indicators, which change color based on the current genlock and sync statuses. For more information, go to "Project Status Indicators" on page 53.

FAN AND TEMPERATURE MANAGEMENT

To select a fan control mode, go to **Menu** > **Settings** > **Setup** > **Fan Control**.

The camera is controlled by complex thermal algorithms to ensure that the sensor and camera operate at safe temperatures. Each fan control mode affects the sensor temperature, sensor warm-up time, fan speed, and resulting fan noise.

When selecting a fan mode, first take into consideration how each fan mode behaves, and then select a fan mode that fits the needs of your project.

Regardless of sensor type and fan mode, you will get the best image quality by calibrating the sensor at the temperature that you want to use for your shoot.

FAN CONTROL MODES

Select a fan control mode.

NOTE: After selecting a new fan setting, run the camera until the core temperature stabilizes, and then calibrate the sensor.

NOTE: Manual mode requires that you actively manage the sensor temperature, because this mode focuses on controlling fan speed and does not target a narrow sensor temperature range. Use the T/E status indicators as guides for proper temperature calibration.

NOTE: Maximum speeds are intended as target speeds only; actual fan speeds may be higher at times due to long recording times or high ambient temperatures.

ADAPTIVE (TARGET TEMPERATURE)

Select a Target Temperature and the fans self-adjust to maintain the selected temperature. The default Target Temperature is 39°C. After the camera reaches the Target Temperature, and if the ambient temperature remains constant, Adaptive mode results in a consistent fan speed and fan noise over time.

Targeting a higher temperature raises the sensor temperature, lengthens the sensor warm-up time, and lowers the fan speed. Targeting a lower temperature lowers the sensor temperature, shortens the sensor warm-up time, and increases the fan speed.

NOTE: The intent of Target Temperature is to set the sensor temperature so that you can then create a calibration map for that temperature.

NOTE: When the camera turns on, the Target Temperature is the temperature of the current calibration map, regardless of what the Target Temperature was before you turned off the camera. Setting a calibration map also overrides the Target Temperature. For more information, go to "Sensor Calibration" on page 138.

QUIET

Quiet is the default mode for the camera.

The fans self-adjust to maintain the lowest possible noise level in record and standby mode while still cooling the camera.

MANUAL

Select a speed for the fans in both record and standby modes. The fans self-adjust to maintain the selected speeds. The default Maximum Record Speed is 50% and the default Maximum Preview Speed is 75%. The range for both Maximum Record Speed and Maximum Preview Speed is 20–100%.

POST RECORD DELAY

Select the amount of time that it takes for the fan to switch from record to preview mode.

LENS

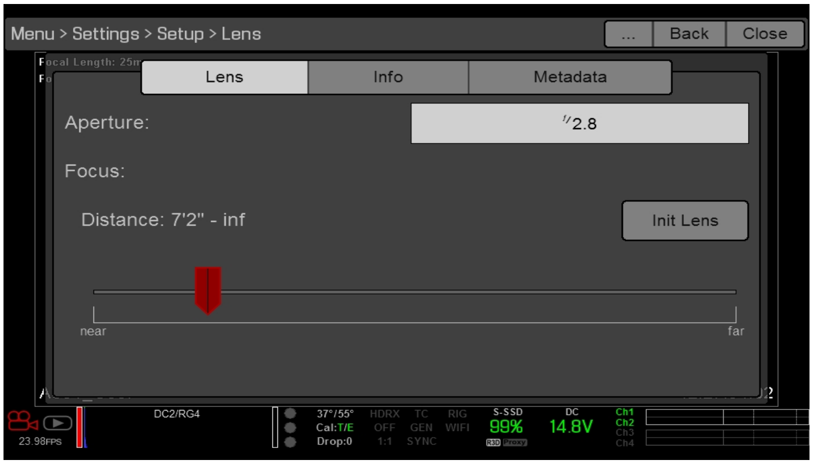
To access the Lens menu, go to **Menu** > **Settings** > **Setup** > **Lens**.

LENS TAB

The options displayed on the Lens tab change based on the attached lens mount.

PL MOUNT

- **Enable Power to Lens**: Ensures that the camera powers the lens via the lens mount. This feature is enabled by default, but the camera saves the last selected setting. Deselect when using a Fujinon® T2.9 Cabrio Premier PL lens. If you disable this feature for the Fujinon Cabrio, re-enable it when using other lenses. For more information, go to "Fujinon T2.9 Cabrio Premier PL Lenses" on page 209.
- **Auto-Detect PL Lenses**: By default, this feature is enabled.
- **Detect Lens**: Detects a lens, if one is attached.


Menu > Settings > Setup > Lens
...
Back
Close
Lens
Info
Metadata
Init Lens
near
far
23.98FPS
DC2/RG4
S-SSD
99%
DC
14.8V

Aperture: f/2.8

Focus:

Distance: 7'2" - inf

Figure: Lens Menu

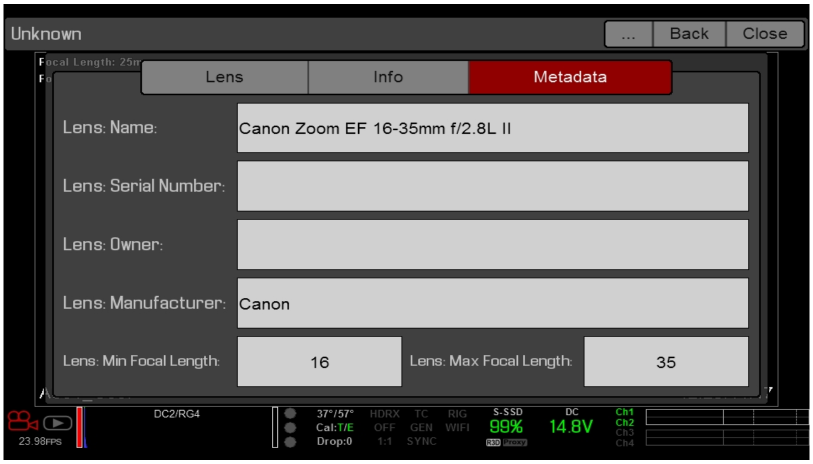
LENS INFO TAB

The Info tab displays the attached lens mount and lens information.

LENS METADATA TAB

If a supported lens is attached, the camera autopopulates some Lens Metadata fields. You can also manually edit the Lens Metadata fields to describe the attached lens. The information is stored in the clip metadata. The Lens Metadata fields are:

- Lens Name
- Lens Serial Number
- Lens Owner
- Lens Manufacturer
- Lens Min Focal Length
- Lens Max Focal Length


Unknown
...
Back
Close
Lens
Info
Metadata
23.98FPS
DC2/RG4
37°/57°
Cal:T/E
Drop:0
HDRX
OFF
TC
GEN
1:1
SYNC
RIG
WIFI
S-SSD
99%
DC
14.8V
Ch1
Ch2
Ch3
Ch4

Lens: Name: Canon Zoom EF 16-35mm f/2.8L II

Lens: Serial Number:

Lens: Owner:

Lens: Manufacturer: Canon

Lens: Min Focal Length: 16

Lens: Max Focal Length: 35

Figure: Metadata

MAINTENANCE

The Maintenance menu includes: Save Log, Upgrade, Calibrate, Self-Test, Restore System, Rediscover, System Status, and OLPF.

SAVE A LOG FILE

A log file is a detailed text file of the processes and operations performed by the camera. If you contact support, you may be asked to send a log file.

To save a log file, follow the instructions below:

1. Ensure that an SSD is properly mounted to the camera.
2. Go to **Menu** > **Settings** > **Maintenance**.
3. Select **Save Log**.

   The log file is saved as a *.txt file in the SSD root directory.

For more information about RED support or to create a support ticket, go to https://support.red.com.

NOTE: The camera automatically saves a log file when it is turned off properly and an SSD is mounted.

UPGRADE

To access the Upgrade menu, go to **Menu** > **Settings** > **Maintenance** > **Upgrade**.

You can check for upgrades for the following items:

- **Camera**: Go to "Upgrade Camera Firmware" on page 161.
- **Media**: For more information on the media upgrade procedure, see the DSMC Media Operation Guide, available at www.red.com/downloads.

CALIBRATE

The Calibrate menu includes:

- **Sensor**: For more information, go to "Sensor Calibration" on page 138.
- **Gyro/Acc**: For more information, go to "Gyroscope and Accelerometer Calibration" below.

GYROSCOPE AND ACCELEROMETER CALIBRATION

The internal three-axis gyroscope and three-axis accelerometer need to be calibrated for the Horizon overlay to function properly. The Gyro/Acc calibration file is stored in the flash memory of the camera, so you DO NOT need to recalibrate after restoring the camera or upgrading firmware. For more information, go to "Display Modes: Horizon" on page 78.

To calibrate the Horizon overlay, follow the instructions below:

1. Turn on the camera and place it on a level surface.
2. Wait for the camera core temperature to reach room temperature.
3. Go to **Menu** > **Settings** > **Maintenance** > **Calibrate** > **Gyro/Acc** and select **Low Temperature Calibration**.
4. After the calibration finishes, wait for the camera core temperature to reach maximum operating temperature.
5. When the camera reaches maximum operating temperature, select **High Temperature Calibration**.

SELF-TEST

The Self-Test menu includes: Enable/Disable Sensor Test Pattern and Touchscreen.

ENABLE/DISABLE SENSOR TEST PATTERN

The Sensor Test Pattern is used during manufacturing and stress testing. For more information, go to "Perform a Stress Test" on page 166. The Sensor Test Pattern is a white screen with vertical lines.

To enable/disable the sensor test pattern, go to **Menu** > **Settings** > **Maintenance** > **Self-Test** > **Enable/Disable Sensor Test Pattern**.

TOUCHSCREEN

To perform a touchscreen self-test, follow the instructions below:

1. Go to **Menu** > **Settings** > **Maintenance** > **Self-Test**.
2. Select **Touchscreen**.

   A grid of green squares displays on the touchscreen.
3. Touch each box with your finger.

   Each green box turns blue.
4. To exit the self-test, perform one (1) of the following actions:
   - Touch all of the boxes, so that they are all blue.
   - Press and hold the touchscreen.
   - Press the **Enter** or **Menu** button on the side of the camera.

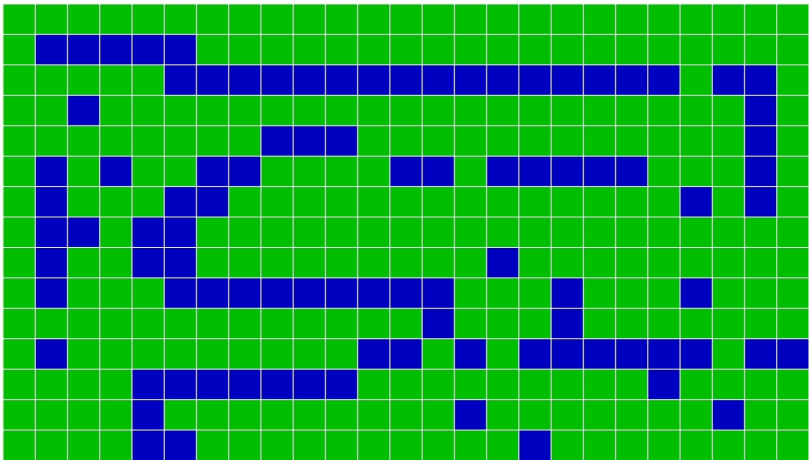


Figure: Self-Test Menu

RESTORE SYSTEM

Restore System offers two (2) types of restores: Reset Defaults and Wipe Camera.

RESET DEFAULTS

Reset Defaults changes all settings to the factory default values. To perform a Reset Defaults, follow the instructions below:

1. Go to **Menu** > **Settings** > **Maintenance** > **Restore System**.
2. Select **Reset Defaults**.
3. Select **YES** on the screen that asks you to confirm the action.

   The camera turns off.
4. Turn on the camera.

WIPE CAMERA

Wipe Camera deletes all user settings, including: looks, calibration files, overlays, and presets. Wipe Camera restores all factory defaults.

1. Go to **Menu** > **Settings** > **Maintenance** > **Restore System**.
2. Select **Wipe Camera**.
3. Select **YES** on the screen that asks you to confirm the action.

   The camera turns off.
4. Turn on the camera.

REDISCOVER (HARDWARE REDISCOVER)

Rediscovers all hardware and caches the data for future boot cycles. Perform a Hardware Rediscover if an attached device or lens mount is not functioning correctly.

To perform a Hardware Rediscover, follow the instructions below:

1. Go to **Menu** > **Settings** > **Maintenance**.
2. Select **Rediscover**.
3. Select **Yes** on the screen that asks you to confirm the Hardware Rediscover.

   The camera turns off.
4. Turn on the camera.

SYSTEM STATUS

The System Status menu displays key project and system information.

PROJECT STATUS

Displays the current camera and project settings. Includes the following tabs: File Format, Recording, ProRes, DNxHD/HR, Image, Other.

ATTACHED MODULES

Lists the attached lens mount.

This screen does not list attached displays and lenses.

RCP CONNECTIONS

Lists any RCP clients the camera is connected to.

CAMERA INFO

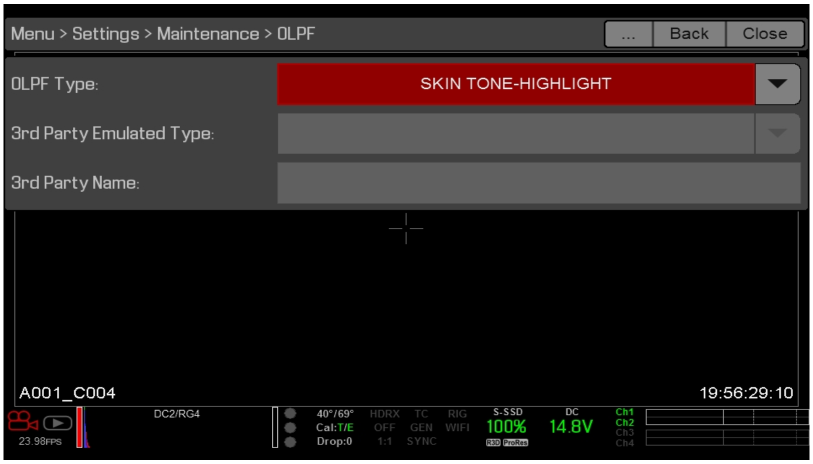
Displays the following camera information:

- **Type**: Camera type and sensor type.
- **Firmware Version**: Current firmware version.
- **PIN**: The personal identification number that is specific to your camera.
- **SVN Revision**: The current firmware number.
- **Runtime**: The number of hours that the camera has been turned on.
- **Name**: Sensor type.

OLPF

RED offers multiple optical low-pass filters (OLPFs). Each OLPF optimizes certain characteristics to take full advantage and control of each shooting environment. The camera checks the OLPF type, and adjusts the color science based on the selected OLPF.

To view your OLPF type, go to **Menu** > **Settings** > **Maintenance** > **OLPF**. The OLPF that is installed in your camera displays in the **OLPF Type** field.


Menu > Settings > Maintenance > OLPF
...
Back
Close

OLPF Type: SKIN TONE-HIGHLIGHT

3rd Party Emulated Type:

3rd Party Name:

A001_C004
19:56:29:10
23.98FPS
DC2/RG4
40°/69°
Cal:T/E
Drop:0
HDRX
OFF
1:1
TC
GEN
SYNC
RIG
WIFI
S-SSD
100%
R3D
ProRes
DC
14.8V
Ch1
Ch2
Ch3
Ch4

Figure: OLPF Menu

THIRD-PARTY OLPFS

WARNING: RED does not guarantee that third-party OLPFs will work as intended. Any damage caused by using a third-party OLPF, or any undesirable effects to the footage caused by using a third-party OLPF, is not covered under any RED warranty. If you have any questions or support issues with a third- party OLPF, contact the OLPF's manufacturer.

If you are using a third-party OLPF, follow the instructions below to set up the OLPF:

1. Install the OLPF. For more information, go to "Swap an Interchangeable OLPF" on page 40.
2. Go to **Menu** > **Settings** > **Maintenance** > **OLPF**.
3. Select an option from the **3rd Party Emulated Type** drop-down menu. This menu lists the RED OLPFs that are available for the camera. The camera will simulate the color science based on the RED OLPF that you select. RED DOES NOT guarantee that the third-party OLPF and the camera's color science will match.
4. Enter a name for the OLPF in the **3rd Party Name** field. The name that you enter is for metadata purposes; the name has no effect on the color science.

CHAPTER 6:

SENSOR CALIBRATION

Sensor calibration, also known as black shading, is a process during which the camera optimizes image quality by ensuring that pixel sensitivity remains consistent throughout the sensor. Calibrating the sensor generates a calibration map based on system and environment settings. After calibration, the sensor shows a uniform noise profile over the whole area without any falloffs on any side.

The camera offers two (2) ways to calibrate the sensor:

- **Manual Calibration**: RED recommends using Manual Calibration for the MONSTRO 8K VV sensor. For more information, go to "Calibrate Sensor: Manual Calibration" on the next page.
- **Auto Calibration**: For more information, go to "Calibrate Sensor: Auto Calibration" on page 140.

For more information, see the Sensor Calibration Methods article.

NOTE: Calibration maps are still available after performing a system restore.

WHEN TO CALIBRATE SENSOR

Calibration is required:

- After an extreme change in temperature (+/– 30°F or +/–15°C) from the current calibration map.
- After an extreme change in exposure time (+/– 1/2 sec) from the current calibration map.
- If either the T or E in the CAL: T/E indicator is not green.
- After each firmware upgrade.

To check the temperature/exposure of the current calibration file, go to **Menu** > **Settings** > **Maintenance** > **System Status** > **Project Status**.

CALIBRATE SENSOR: MANUAL CALIBRATION

The camera offers two (2) ways to calibrate the sensor: Manual Calibration and Auto Calibration. This section describes how to calibrate the sensor with Manual Calibration.

When you start a Manual Calibration, the camera calibrates the sensor at the current exposure and temperature setting. You will need to re-calibrate the sensor after extreme changes in exposure and temperature. The Manual Calibration process takes several minutes.

MANUAL CALIBRATION PROCEDURE

To perform a Manual Calibration, follow the instructions below:

1. Ensure that the camera reaches the temperature that you want to use for your shoot.
2. Set the exposure to the exposure that you want to use for your shoot.
3. Ensure that the sensor is as dark as possible.
    - Preferably, take off the lens, and install the front body cap.
    - If you cannot take off the lens, put a lens cap on the lens. (Not all lens caps completely block IR. Lens caps are made to protect the lens, not necessarily to block light.)
    - If possible, use a dark room.
    - Just closing the aperture is NOT sufficient.
4. Go to **Menu** > **Settings** > **Maintenance** > **Calibrate** > **Sensor** > **Create** > **Manual**.
5. Select how many calibration maps that you want to create from the **Number of captures** drop-down menu. You can create up to four (4) calibration maps at a time.
6. Select the exposure that you want for each calibration map from the **Capture** drop-down menus.
7. Select **Start Capture(s)**.
8. Select **OK** on the dialog box that opens. The system initializes and then makes multiple passes through the following phases of the calibration:
    - Capturing
    - Analyzing
    - Erasing
    - Programming
9. When the Calibration Successful dialog displays, select **OK** to complete the process.

    The new calibration map is automatically selected.

CALIBRATE SENSOR: AUTO CALIBRATION

NOTE: The camera cannot export calibration maps created by Auto Calibration.

The camera offers two (2) ways to calibrate the sensor: Manual Calibration and Auto Calibration. This section describes how to calibrate the sensor with Auto Calibration.

When you start an Auto Calibration, the camera calibrates the sensor at 16 exposure settings, and uses that data to build a calibration curve. Afterward, the sensor is calibrated for each exposure along the calibration curve, so you do not need to re-calibrate every time you change the exposure.

The calibration process does not factor in multiple temperatures, so you will need to re-calibrate the sensor after extreme changes in temperature.

This process can take up to 1 hour.

AUTO CALIBRATION PROCEDURE

To perform an Auto Calibration, follow the instructions below:

1. Ensure that the camera reaches the temperature that you want to use for your shoot.
2. Ensure that the sensor is as dark as possible.
   - Preferably, take off the lens, and install the front body cap.
   - If you cannot take off the lens, put a lens cap on the lens. (Not all lens caps completely block IR. Lens caps are made to protect the lens, not necessarily to block light.)
   - If possible, use a dark room.
   - Just closing the aperture is NOT sufficient.
3. Ensure a properly formatted SSD is attached to the camera.
4. Go to **Menu** > **Settings** > **Maintenance** > **Calibrate** > **Sensor** > **Create** > **Auto**.
5. Select **OK** on the dialog box that opens. The system initializes and then makes multiple passes through the calibration phases.
6. When the Calibration Successful dialog displays, select **OK** to complete the process.

NOTE: When you change the exposure setting, the E indicator turns yellow and it may take up to 8 seconds for the calibration map to load.

CALIBRATION MAP NAMING CONVENTIONS

Each calibration map has a unique name that uses the format described in the table below:

NAME	DESCRIPTION	EXAMPLE
Exposure	Current exposure; to set exposure, go to "Exposure/Shutter" on page 96	48
	If the calibration map was created using Auto Calibration, then "auto" displays instead of an exposure setting	auto
Sensor Temperature	Sensor temperature (Celsius); in the Lower Status Row, this is the number to the left of the forward slash (Temp: 32/35)	32C
Year	Year that the calibration map is created (yyyy)	2014
Month	Month that the calibration map is created (mm)	01
Day	Day that the calibration map is created (dd)	28
Letters	Two random alphanumeric characters generated by the camera to prevent any possibility of duplicate names being created	LQ

For example, a set of calibration maps may look like this:

- auto_39C_200001030O
- 48_39C_20000103NB
- 24_37C_20160105AT

NOTE: If you mount an SSD with calibration files to your computer, each calibration map displays as a sub-folder in a folder called Calibration. To save a calibration map to your hard drive, copy the entire sub-folder to your drive.

CALIBRATION MANAGEMENT

To apply, export, and import calibration maps, go to **Menu** > **Settings** > **Maintenance** > **Calibrate** > **Sensor**.

- **In Camera**: The calibration maps that are saved internally on the camera:
  - **Factory**: This is the calibration map generated during the manufacturing process. (Default)
  - **All other**: The user-created calibration maps.
- **Media**: The calibration maps that are on the SSD in the path shown (for example, S-SSD\calibration).

CALIBRATION MAP ACTIONS

NOTE: You cannot delete or rename the factory map.

- **Apply**: Apply the selected calibration map (if the calibration map is on the SSD, the camera applies the map temporarily, and does not import it into the camera).
- **Create**: Create a calibration map. For more information, go to "Calibrate Sensor: Manual Calibration" on page 139 and "Calibrate Sensor: Auto Calibration" on the previous page.
- **Delete**: Delete the selected camera calibration map.
- **Rename**: Rename the selected calibration map.

EXPORT AND IMPORT CALIBRATION MAPS

NOTE: The camera cannot export calibration maps created by Auto Calibration.

Calibration maps can be stored on the camera or transferred to SSD. You can also build a library of calibration maps to use in different settings. A camera only imports calibration maps that it created. Calibration maps cannot be shared between cameras.

- ➡ : Export selected calibration map from camera to SSD.
- ➡ **All**: Export all files from camera to SSD.
- ⬅ : Import selected calibration map from SSD to camera. This overwrites the user HS calibration map.
- ⬅ **All**: Import all files from SSD to camera.

CHAPTER 7:

AUDIO SYSTEM

AUDIO OVERVIEW

The camera has two (2) integrated dual channel digital stereo microphones that record uncompressed audio at 24-bit 48 kHz. These microphones offer you the ability to capture scratch-track audio.

The camera features a built-in headphone jack, so you can hear the audio during playback via headphones. Together, the integrated microphones and headphone jack offer an audio solution for run-and-gun shoots.

Additionally, the camera has one full-size XLR audio jack for recording line level and microphone level audio.

The camera can record up to four (4) discrete stereo channels of uncompressed 24-bit, 48 kHz audio.

Input signals are routed via a high-quality pre-amplifier to achieve the desired recording levels and maximize dynamic range.

Audio data is synchronized with video and timecode and embedded in the R3D® file. You can export audio data from REDCINE-X PRO® as separate audio files.

Audio is also embedded in any HD-SDI output connected to the camera (except the MON-1 signal).

SET UP AUDIO

To set up audio, go to **Menu** > **Settings** > **Audio**. To adjust the input, pre-amplifier, and headphone settings, select **Control**. To adjust the mix settings, select **Mix**.

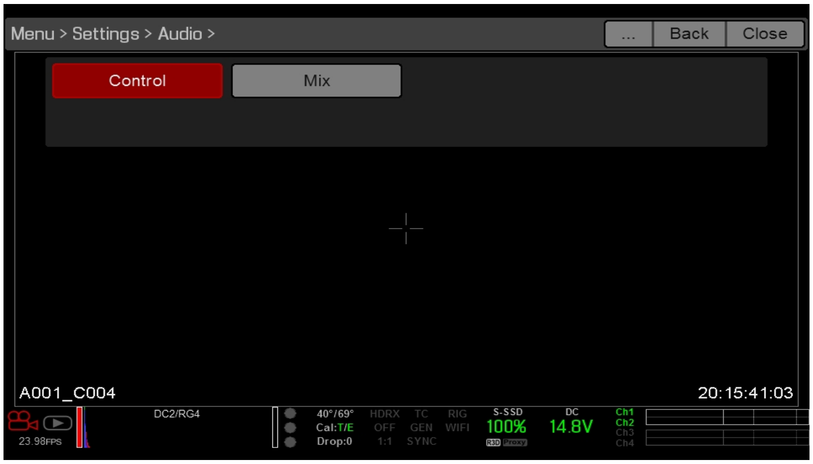

Menu > Settings > Audio >
...
Back
Close
Control
Mix
A001_C004
20:15:41:03
23.98FPS
DC2/RG4
40°/69°
Cal:T/E
Drop:0
HDRX
OFF
1:1
TC
GEN
SYNC
RIG
WIFI
S-SSD
100%
R3D
Proxy
DC
14.8V
Ch1
Ch2
Ch3
Ch4

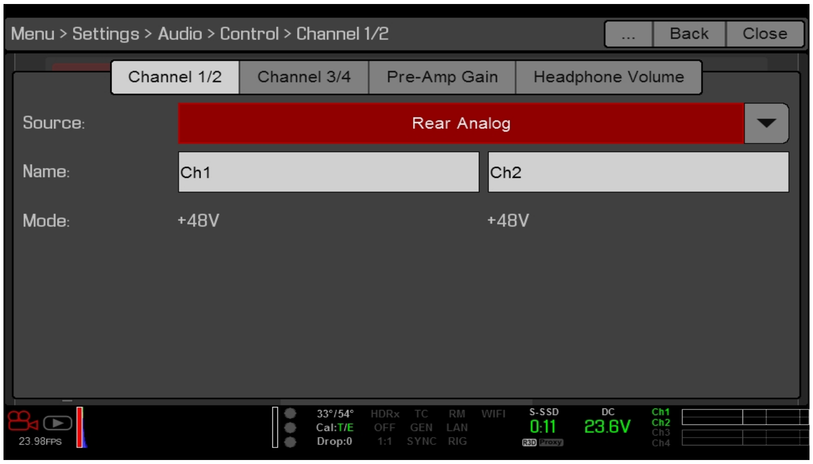
Figure: Audio Menu

CONTROL

To adjust the input, pre-amplifier, and headphone settings, select **Control**.

CHANNEL 1/2 AND CHANNEL 3/4

To set up Channel 1/2 and 3/4, go to **Menu** > **Settings** > **Audio** > **Control**.


Menu > Settings > Audio > Control > Channel 1/2
...
Back
Close
Channel 1/2
Channel 3/4
Pre-Amp Gain
Headphone Volume
23.98FPS
33°/54°
Cal:T/E
Drop:0
HDRx
OFF
1:1
TC
GEN
SYNC
RM
LAN
RIG
WIFI
S-SSD
0:11
R3D
Proxy
DC
23.6V
Ch1
Ch2
Ch3
Ch4

Source: Rear Analog

Name: Ch1 Ch2

Mode: +48V +48V

Figure: Channel Setup

SOURCE

SOURCE NAME	CHANNEL PAIRS	CONNECTORS
None	N/A	N/A
Camera Internal	Ch1/Ch2, Ch3/Ch4	Mic 1, Mic 2
Rear Analog	Ch1/Ch2, Ch3/Ch4	AUDIO (full-size XLR)

NAME

You can rename each audio channel. The default names are Ch1, Ch2, Ch3, and Ch4. The channel names display in the Audio Meter, but are not included in the clip metadata.

MODE

When Rear Analog is selected, the Mode (Line, Mic, or +48V) displays for the incoming audio signal.

PHANTOM POWER

The 5-pin XLR connector provides +48 V phantom phantom power.

Enable phantom power (via the switch adjacent to the XLR port) after a microphone is connected. Disable phantom power (by switching to Line or Mic) before removing the microphone.

PRE-AMP GAIN

Pre-amp gain range is 0 dB to 55 dB. Default is 0 dB.

To adjust amplification levels, follow the instructions below:

1. Go to **Menu** > **Settings** > **Audio** > **Control** > **Pre-Amp Gain**.
2. Move the **Pre-Amp** (pre-amplifier) sliders up and down to adjust the amplification levels.
3. To link the amplification for each channel, select **Link**.

HEADPHONE VOLUME

Headphone volume range is –54 dB to 0 dB. Default is 0 dB.

CHANGE HEADPHONE VOLUME

1. Go to **Menu** > **Settings** > **Audio** > **Control** > **Headphone Volume**.
2. Move the **Left** and **Right** sliders up and down to adjust the volume.
3. To toggle mute/unmute, select **Mute**.
4. To link the volume for Left and Right, select **Link**.

MIX

The camera features a digital audio mixer that controls the volume and stereo settings for each input channel. The mixer affects audio monitoring (such as headphones) and audio recorded to external devices. The mixer DOES NOT affect audio embedded in the R3D file. To access mix settings, go to **Menu** > **Settings** > **Audio** > **Mix**.

The range for each channel is 0% to 100%. The default for each active channel is 100%.

The digital mixer normalizes each output to prevent the output from exceeding the signal range. For example, if you pass Channel 1 to an output at 100%, and then mix Channel 2 into the same output, the level of Channel 1 decreases to 50%.

Assign each audio channel to the Left, Middle, or Right side of the stereo mix. Move the sliders up and down to adjust the volume.

You can control the volume and stereo for each audio monitoring option:

- **Headphone Mix**: Headphones plugged into the camera.
- **Monitor Mix**: External HD-SDI monitors that support audio.

AUDIO OUTPUT OPTIONS

- One (1) 2-channel headphone output. For maximum quality, use high impedance headphones.
- **HD-SDI monitor**: Output two (2) channels of 24-bit 48 kHz uncompressed, embedded digital audio. Select and mix the stereo channels in the Monitor Mix menu at **Menu** > **Settings** > **Audio** > **Mix** > **Monitor Mix**. To monitor or HD-SDI, the third-party monitor must support audio.

AUDIO METER (VU METER)

The Audio Meter displays at the bottom-right corner of the viewfinder, and displays either the incoming audio channels (default), or the outgoing audio (mixes). For more information, go to "VU Meter" on page 80.

INCOMING AUDIO CHANNELS

When you select Input as the VU Meter Source, the Audio Meter displays the incoming audio channels (default). For more information, go to "VU Meter" on page 80. Channel 1 and Channel 2 are the default channels, correlating with the MIC-1 and MIC-2 inputs on the camera. Channel 3 and Channel 4 are greyed out unless the camera detects audio input.

The channel names selected in the Audio menu determine the channel names displayed in the Audio Meter.

The Audio Meter shows the incoming audio signal when a source is selected, even if the channel is not recorded. When a channel is recorded, the channel indicator left of the Audio Meter is green.

OUTGOING AUDIO

When you select Output as the VU Meter Source, the Audio Meter displays the Headphone Mix, Audio Out Mix, and Monitor Mix levels. For more information, go to "VU Meter" on page 80.

When recording to an external device, use the Output levels to help accurately monitor recorded audio.

AUDIO METER LEVELS

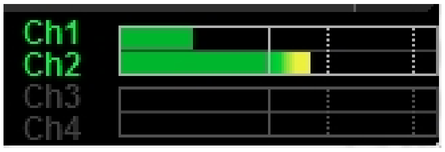


Figure: Audio Meter

The camera updates the Audio Meter 12 times per second with the maximum signal from the last 1/12 of a second period. The range of the Audio Meter is –52 dBFS to 0 dBFS.

The lines and colors indicate danger of clipping, as described in the table below:

LINE	DBFS	COLOR	DESCRIPTION
First line (far left border; solid)	–52 dBFS	Green	Audio is not clipping
Second line (solid)	–20 dBFS	Green	Audio is not clipping
Third line (dashed)	–12 dBFS	Yellow	Audio close to clipping
Fourth line (dashed)	–2 dBFS	Red	Audio is clipping
Fifth line (far right border; solid)	0 dBFS	Red	Audio is clipping (if signal exceeds –1 dBFS, the whole bar is red)

NOTE: In the American broadcast and post production systems, –20 dBFS roughly corresponds to 0 VU and 4 dBu. In a digital system, dBu is an approximation; the correct unit for digital audio levels is dBFS.

AUDIO DURING PLAYBACK

The camera plays all recorded channels during playback(via headphones and HD-SDI monitors), and automatically unmutes any muted audio outputs.

To access audio settings during playback, go to **Menu** > **Settings** > **Audio** and select the following tabs:

- Control
- Mix

RECORD AUDIO IN VARISPEED MODE

The camera supports recording audio in Varispeed mode when all of the following criteria is met:

- The Recording Frame Rate is higher than the Project Time Base
- The Recording Storage is set to Local, and the Recording mode is set to Continuous Record (Menu > Settings > Recording > Mode)
- The Record varispeed audio in a separate WAV file check box is selected (Menu > Settings > Recording > Mode)
- The Record File Format includes R3D (Menu > Settings > Recording > Codec)

To record audio in Varispeed mode, follow the instructions below:

1. Set the Recording Frame Rate to a higher rate than the Project Time Base. The camera cannot record audio when the Recording Frame Rate is lower than the Project Time Base. For more information, go to "Frame Rate" on page 95.

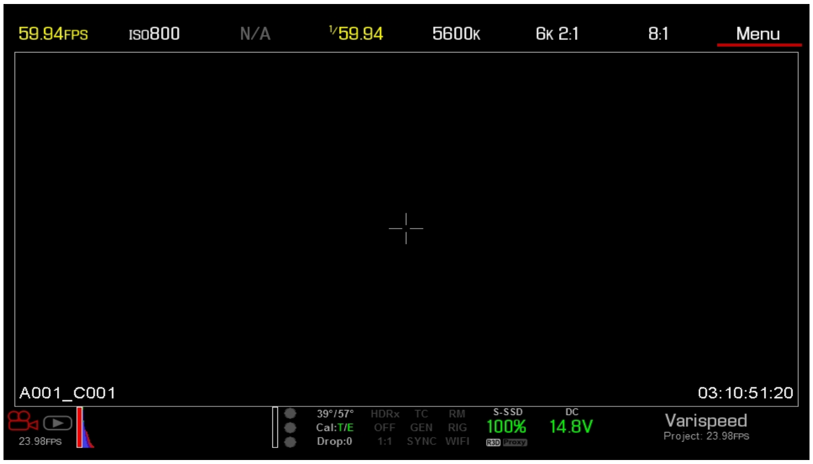
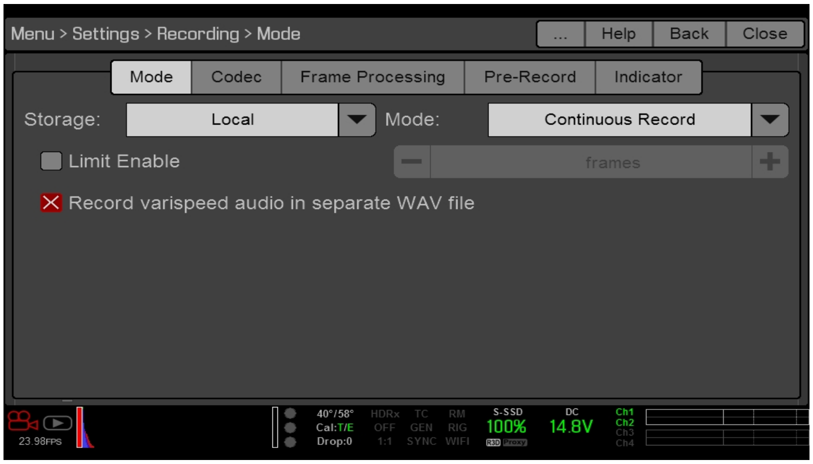

59.94FPS
ISO800
N/A
1/59.94
5600K
6K 2:1
8:1
Menu
A001_C001
03:10:51:20
23.98FPS
39°/57°
Cal:T/E
Drop:0
HDRx
OFF
1:1
TC
GEN
SYNC
RM
RIG
WIFI
S-SSD
100%
R3D Proxy
DC
14.8V
Varispeed
Project: 23.98FPS

Figure: Enable Varispeed

2. Go to **Menu** > **Settings** > **Recording** > **Mode**.
3. Select **Local** from the **Storage** drop-down menu.
4. Select **Continuous Record** from the **Mode** drop-down menu.

5. Select the **Record varispeed audio in a separate WAV file** check box. This option is available only when the Recording Frame Rate is higher than the Project Time Base.

   The Audio Meters display in the Lower Status Row. For more information, go to "Audio Meter (VU Meter)" on page 145.



Menu > Settings > Recording > Mode
...
Help
Back
Close
Mode
Codec
Frame Processing
Pre-Record
Indicator
frames
23.98FPS
40°/58°
Cal:T/E
Drop:0
HDRx
OFF
1:1
TC
GEN
SYNC
RM
RIG
WIFI
S-SSD
100%
R3D
Proxy
DC
14.8V
Ch1
Ch2
Ch3
Ch4

Storage: Local

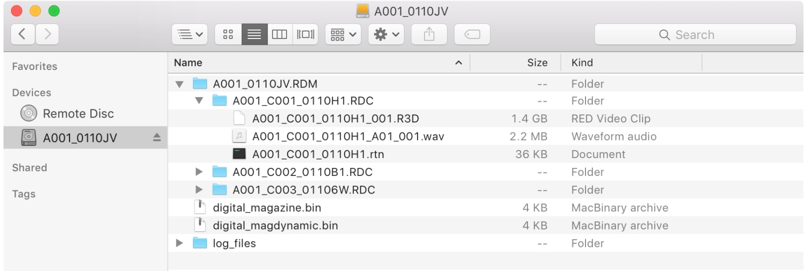
Mode: Continuous Record

☐ Limit Enable

☒ Record varispeed audio in separate WAV file

Figure: Record Varispeed Audio

6. Record.
7. When you mount the SSD to a computer, a WAV file displays in the RDC folder.



A001_0110JV
Search
Favorites
Devices
Remote Disc
A001_0110JV
Shared
Tags

Name	Size	Kind
A001_0110JV.RDM	--	Folder
A001_C001_0110H1.RDC	--	Folder
A001_C001_0110H1_001.R3D	1.4 GB	RED Video Clip
A001_C001_0110H1_A01_001.wav	2.2 MB	Waveform audio
A001_C001_0110H1.rtn	36 KB	Document
A001_C002_0110B1.RDC	--	Folder
A001_C003_01106W.RDC	--	Folder
digital_magazine.bin	4 KB	MacBinary archive
digital_magdynamic.bin	4 KB	MacBinary archive
log_files	--	Folder

Figure: WAV File in RDC Folder

CHAPTER 8:

TIMECODE, GENLOCK, MULTI-CAMERA SETUP

This chapter describes timecode, genlock, and multi-camera operations such as 3D and array setup.

TIMECODE

Timecode is a numeric sequence based on SMPTE 12M that aids in the management and synchronization of footage and audio. Timecode is embedded in recorded RAW files, QuickTime® files (if recording an Apple® ProRes codec), and MXF files (if recording an Avid® codec) as metadata and in HANC metadata provided by the HD-SDI monitor output. The camera can generate timecode on its own or can receive and sync to timecode generated by an external source. RED cameras use non-drop frame timecode.

Timecode displays in the lower right corner of the Live Action Area on the graphical user interface (GUI) and is embedded as metadata. Timecode is represented as an eight (8) digit sequence (HH:MM:SS:FF), where:

- **HH**: Hours
- **MM**: Minutes
- **SS**: Seconds
- **FF**: Frames

NOTE: Timecode is most accurate and effective when coupled with genlock. For more information, go to "Genlock" on page 151.

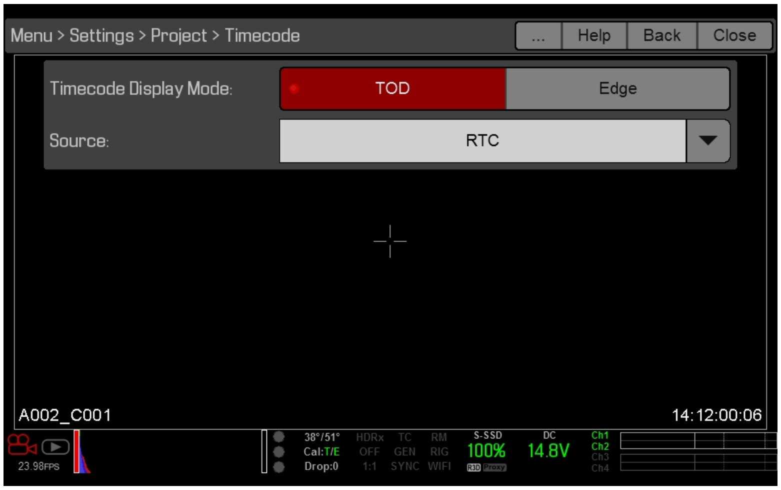
NOTE: For more information on HANC metadata, see HD-SDI HANC Metadata Information, available at www.red.com/developers.

SET UP INTERNAL TIMECODE

To set up and adjust timecode generated by the camera, follow the instructions below:

1. Go to **Menu** > **Settings** > **Project** > **Timecode**.
2. Select the desired **Timecode Display** mode.
3. Set **Source** to **RTC**.

   The **TC** indicator in the Lower Status Row remains grey when internal timecode is enabled.



Menu > Settings > Project > Timecode

Timecode Display Mode: TOD

Source: RTC

...
Help
Back
Close
TOD
Edge
A002_C001
14:12:00:06
23.98FPS
38°/51°
Cal:T/E
Drop:0
HDRx
OFF
1:1
TC
GEN
SYNC
RM
RIG
WIFI
S-SSD
100%
R3D
Proxy
DC
14.8V
Ch1
Ch2
Ch3
Ch4

Figure: Timecode

INPUT EXTERNAL TIMECODE

To input timecode generated by an external device, follow the instructions below:

1. Connect the **TIMECODE** port on the camera to the device using a 75 ohm BNC cable.
2. Go to **Menu** > **Settings** > **Project** > **Timecode**.
3. Select the desired **Timecode Display** Mode.
4. Set **Source** to **External**.

   The **TC** indicator in the Lower Status Row turns green when an external timecode source is locked.

   NOTE: When an external source is selected but not present, timecode displays User Provided settings.

REQUIRED CABLE

- **790-0212**: PRO I/O TIMECODE CABLE (3')

GENLOCK

Generator locking (genlock) is a tri-level signal used to synchronize video and audio systems. Genlock is based on SMPTE 296M and 274M. There are two (2) important genlock sync modes:

- Monitor Sync
- Sensor Sync

MONITOR SYNC

Monitor Sync occurs when an incoming genlock signal is compatible with the monitor output frequency. Monitor Sync is achievable even if the camera is using another form of synchronization to sync the camera sensor.

1. Connect the **GENLOCK** port on the camera to the device using a 75 ohm BNC cable.
2. Set up the frequency for the HD-SDI output (select **Auto** to automatically match the HD-SDI output to the current Project Time Base). For more information, go to "Frequency" on page 71.

   Monitor Sync is achieved automatically when an incoming genlock signal is compatible with the monitor output frequency. When Monitor Sync is achieved, the **GEN** indicator illuminates green.

REQUIRED CABLE

- 75 ohm BNC cable (such as the RED HD-SDI Cable, P/N 790-0341)

SENSOR SYNC

NOTE: HDRX® is not available when Genlock Sensor Sync is enabled.

Sensor Sync is achieved when an incoming genlock signal is compatible with the monitor output frequency, project time base, and recording frame rate. In Sensor Sync mode, sensor timing is locked to the genlock signal. Sensor Sync requires the following synchronized settings:

SETTING	MENU LOCATION PATH
Genlock signal frequency	N/A; external genlock device
HD-SDI monitor output frequency	Menu > Monitoring > Monitors > select monitor
Project Time Base	Menu > Settings > Project > Frame Rate
Recording Frame Rate	Menu > Settings > Project > Frame Rate

SET UP SENSOR SYNC MODE

To set up and enable Sensor Sync Mode, follow the instructions below:

1. Ensure that the Project Time Base and Recording Frame Rate will be compatible with the incoming genlock signal.
2. Connect the **GENLOCK** port on the camera to the device using a 75 ohm BNC cable.
3. Go to **Menu** > **Settings** > **Setup** > **GPIO/Sync** > **Sync**.
4. Select **Genlock** from the **Sensor Sync Mode** drop-down menu.
5. Set up the frequency for the HD-SDI output (select **Auto** to automatically match the HD-SDI output to the current Project Time Base). For more information, go to "Frequency" on page 71.

   The **GEN** indicator in the Lower Status Row turns green when a compatible genlock signal is present and genlock is enabled. The SYNC indicator in the Lower Status Row turns green when Sensor Sync is achieved.

REQUIRED CABLE

- 75 ohm BNC cable (such as the RED HD-SDI Cable, P/N 790-0341)

MASTER/SLAVE OPERATION

NOTE: The Master camera controls metadata and basic camera parameters of the Slave cameras. Any other setting changes required by the Slave cameras must be made before recording.

This section describes operation in Master/Slave configuration and clip naming conventions for clips recorded on those cameras. Master/Slave is the most common configuration for Stereo/3D productions.

When cameras are operated in Master/Slave configuration, you can perform the following operations:

- **Power**: Turn off the Master camera to turn off both cameras.
- **Record**: Press the **PWR/REC** key on the Master camera to start/stop recording on both cameras.
- **Change settings**: Change settings on the Master camera, to change settings on the Slave camera.

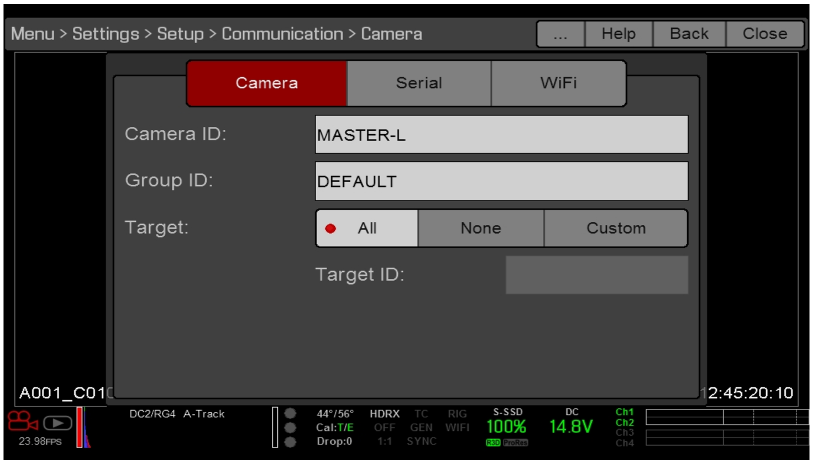
For a Master/Slave configuration to function, the cameras must have the same:

- Firmware version
- Project time base
- Recording frame rate
- Sensor

NOTE: You can Master/Slave RED RANGER and DSMC2 MONSTRO, because both cameras have the same sensor.

SET UP MASTER/SLAVE OPERATION

1. Connect the **GIG-E** port on one camera to the **GIG-E** port on the other camera using the Master/Slave Gig-E Cable.
2. On the Master camera, follow the instructions below:
   A. Go to **Menu** > **Settings** > **Setup** > **Communication**.
   B. Type a name for the camera (Example: CAM A, LEFT, MASTER, etc) in the **Camera ID** field.
   C. Set **Target** to **All**.


Menu > Settings > Setup > Communication > Camera
...
Help
Back
Close
Camera
Serial
WiFi
None
Custom
A001_C01
12:45:20:10
23.98FPS
DC2/RG4 A-Track
44°/56°
Cal:T/E
Drop:0
HDRX
OFF
1:1
TC
GEN
SYNC
RIG
WIFI
S-SSD
100%
R3D
ProRes
DC
14.8V
Ch1
Ch2
Ch3
Ch4

Camera ID: MASTER-L

Group ID: DEFAULT

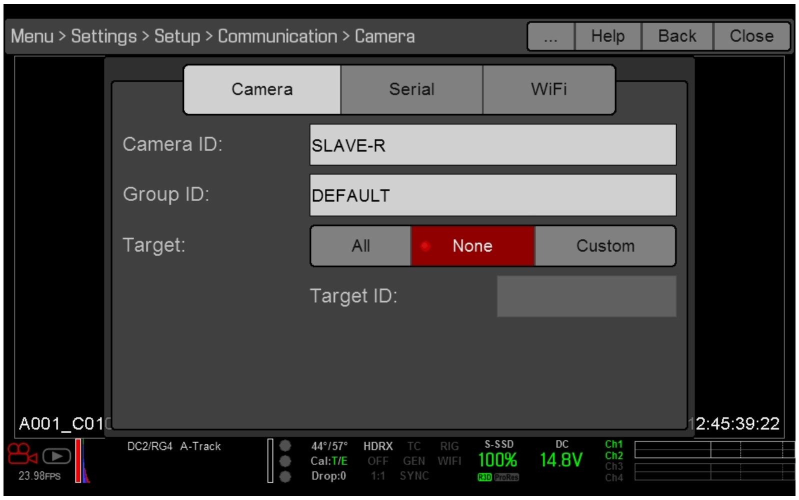
Target: ● All

Target ID:

Figure: Master Settings

   D. Go to **Menu** > **Settings** > **Setup** > **Communication** and select the **Ethernet** tab.
   E. Select the **Camera to Camera** the check box.

3. On the Slave camera(s), follow the instructions below:
   - A. Go to **Menu** > **Settings** > **Setup** > **Communication**.
   - B. Type a name for the camera (Example: CAM B, RIGHT, SLAVE, etc) in the **Camera ID** field.
   - C. Set **Target** to **None**.


Menu > Settings > Setup > Communication > Camera
...
Help
Back
Close
Camera
Serial
WiFi
A001_C01
12:45:39:22
23.98FPS
DC2/RG4 A-Track
44°/57°
Cal:T/E
Drop:0
HDRX
OFF
1:1
TC
GEN
SYNC
RIG
WIFI
S-SSD
100%
DC
14.8V
Ch1
Ch2
Ch3
Ch4

Camera ID: SLAVE-R

Group ID: DEFAULT

Target: All [✓ None] Custom

Target ID:

Figure: Slave Settings

   - D. Go to **Menu** > **Settings** > **Setup** > **Communication** and select the **Ethernet** tab.
   - E. Select the **Camera to Camera** check box.

     The LAN indicator in the Lower Status Row illuminates green.

NOTE: Cameras can also be set up in a Master/Master configuration. To set up Master/Master, set **Target** to **All** on both cameras, allowing either camera to make changes and control record start/stop.

REQUIRED CABLE

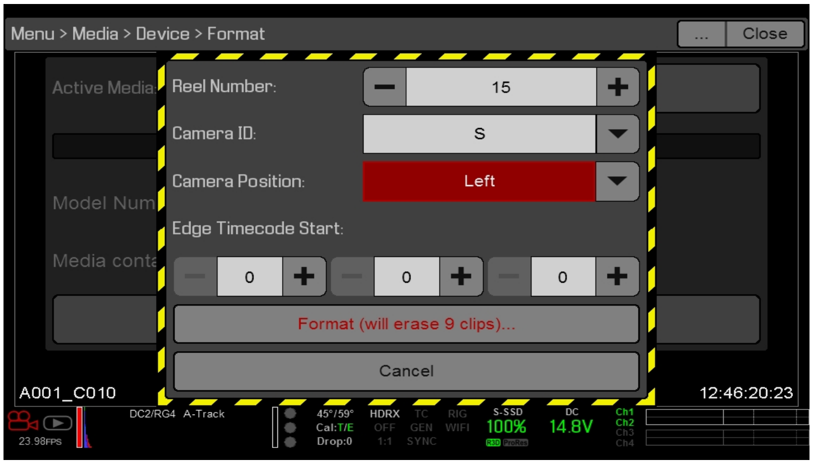
- **790-0163**: Master/Slave Gig-E Cable (4')

SET REEL NUMBER, CAMERA ID, AND CAMERA POSITION

NOTE: Camera ID and Camera Position settings can also be found at **Menu** > **Settings** > **Project** > **Slate** > **Camera**.

To prepare media and slate settings for a Master/Slave or Stereo/3D production, follow the instructions below:

1. On both Master and Slave cameras, go to **Menu** > **Media** > **Device** and select **Format Media...**.
2. On both Master and Slave cameras, select the desired **Reel Number** and **Camera ID** settings. The Reel Number and Camera ID settings on both cameras should match.
3. On the Master camera, change the **Camera Position** to **Left**, representing "left eye".


Menu > Media > Device > Format
...
Close
Active Media
Model Num
Media conta
A001_C010
12:46:20:23
23.98FPS
DC2/RG4 A-Track
45°/59°
Cal:T/E
Drop:0
HDRX
OFF
1:1
TC
GEN
SYNC
RIG
WIFI
S-SSD
100%
R3D ProRes
DC
14.8V
Ch1
Ch2
Ch3
Ch4

Reel Number: 15

Camera ID: S

Camera Position: Left

Edge Timecode Start: 0 0 0

Format (will erase 9 clips)...

Cancel

Figure: Master Settings

4. On the Slave camera, change the **Camera Position** to **Right**, representing "right eye".
5. On both cameras, select **Format...** to format media and set the Reel Number, Camera ID, and Camera Position settings.

MULTI-CAMERA CLIP NAMING CONVENTIONS

This section describes automatic camera-generated clip naming conventions based on slate settings. Cameras use the Reel No, Cam ID, and Cam Pos settings to generate a custom clip name.

For example, if you have two (2) cameras in Master/Slave configuration and format media on both cameras with the following settings:

CAMERA	REEL NUMBER	CAMERA ID	CAMERA POSITION
Master	1	S	Left
Slave	1	S	Right

The first clip recorded by this Master/Slave camera configuration is:

- **Master**: S001_L001_0503B6.R3D
- **Slave**: S001_R001_0503R7.R3D

NOTE: B6 and R7 are examples of camera-generated wildcard characters.

NOTE: If both cameras have a Camera Position of Left, the recorded clips will have the same filename structure, with the exception of the camera-generated wildcard characters. For example:

- **Master**: A001_C001_0503B6.R3D
- **Slave**: A001_C001_0503R7.R3D

NOTE: Reel Number, Camera ID, and Camera Position can be set when formatting media.

SET UP STEREO/3D CONFIGURATION

This section describes basic procedures for connecting two (2) cameras in a Master/Slave configuration for 3D operation.

NOTE: When providing the signals to a Stereo Image Processor (SiP) for verifying 3D alignment, set the HD-SDI monitor output on both cameras to have the same overlay configuration.

NOTE: For genlock to function correctly, the cameras must be on the same firmware version, and must be using the same project time base and recording frame rate.

To set up a Stereo/3D setup, follow the instructions below.

1. On both cameras, set the project time base and recording frame rate.
2. On both cameras, follow the instructions in "Sensor Sync" on page 152 to achieve Sensor Sync genlock status.

   The **GEN** and **SYNC** indicators in the Lower Status Row illuminate green.
3. Follow the instructions in "Set Up Master/Slave Operation" on page 154 to set Master and Slave camera settings.
4. On both cameras, follow the instructions in "Set Reel Number, Camera ID, and Camera Position" on page 156 to set up media and camera settings.

REQUIRED CABLES

Use one (1) per camera:

- 75 ohm BNC cable (such as the RED HD-SDI Cable, P/N 790-0341)

Use one (1) per setup:

- **790-0163**: Master/Slave Gig-E Cable (4')

CAMERA ARRAY

SET UP A CAMERA ARRAY

NOTE: For genlock to function correctly, the cameras must be on the same firmware version, and must be using the same project time base and recording frame rate.

NOTE: To operate a camera array setup from a Windows® computer or workstation, you need one of several applications provided by RED® or third-party developers.

You can sync more than two (2) cameras for applications and productions that require a camera array. To set up a camera array, you need a 1000Base-T gigabit Ethernet router.

For more information on camera control, see the R.C.P.™ SDK, available at www.red.com/developers.

To set up a camera array, follow the instructions below:

1. On each camera, go to **Menu** > **Settings** > **Setup** > **Communication** and set the following:
   A. On the **Camera** tab, set **Target** to **All**.
   B. On the **Camera** tab, enter a matching name in the **Group ID** field. All cameras must have the same Group ID name.
   C. On the **Ethernet** tab, select the **DHCP**, **Camera to Camera**, and **External Control** check boxes.
2. Follow the instructions in "Sensor Sync" on page 152 to connect each camera to the genlock device.

   The **GEN** and **SYNC** indicators in the Lower Status Row illuminate green.
3. Follow the instructions in "Set Up Master/Slave Operation" on page 154 to set Master and Slave camera settings. Instead of using the Master/Slave Gig-E Cable, connect each camera to the router using a 9-Pin 0B GIG-E-To-CAT5E Ethernet Cable.
   A. Connect the LCD/EVF connector to the **GIG-E** port on the camera.
   B. Connect the Ethernet connector to the router.
4. On each camera, follow the instructions in "Set Reel Number, Camera ID, and Camera Position" on page 156 to prepare media and camera settings.

REQUIRED CABLES

Use one (1) per camera:

- **790-0154, 790-0643**: 3BNC-to-00 Sync Cable
- 75 ohm BNC cable (such as the RED HD-SDI Cable, P/N 790-0341)

Use one (1) of the following per setup:

- **790-0159**: RED GIG-E Straight-to-CAT5E Ethernet Cable (9')
- **790-0557, 790-0655**: RED GIG-E Right-to-CAT5E Ethernet Cable (9')

COMPATIBLE TIMECODE DEVICES

The following timecode devices are compatible with the camera. Additional timecode devices may be compatible, but have not yet been tested by RED.

- Ambient ACL 202CT
- Ambient LOCKIT ACL 203
- Ambient ACL 204
- Ambient ACC 501 Clockit Controller
- Ambient ACD-301 Lockit Slate
- Denecke SB-3 Syncbox Time-Code Generator
- Sound Devices 788T
- Sound Devices 744
- Sound Devices PIX-240
- Zaxcom Nomad 12
- Zaxcom ZFR100
- Zaxcom ZFR200

COMPATIBLE GENLOCK DEVICES

The following genlock devices are compatible with the camera. Additional genlock devices may be compatible, but have not yet been tested by RED.

- AJA® GEN10 HD/SD/AES Sync Generator with Universal Power Supply
- Ambient ACL 202CT
- Ambient ACL 203
- Ambient ACL 204
- Denecke SB-T
- Evertz Master Clock 5600MSC

NOTE: Ensure that your genlock device provides a full-strength genlock signal to each camera. Splitting a genlock signal weakens it, which may compromise the sync between cameras.

CHAPTER 9:

UPGRADE CAMERA FIRMWARE

Your camera functionality may be upgraded by installing the latest firmware. Make a habit of frequently visiting RED Downloads at www.red.com/downloads to check for new versions of camera firmware, updated operation guides, and post production software.

VERIFY CURRENT CAMERA FIRMWARE

To see the firmware version that is currently installed on your camera, go to **Menu** > **Settings** > **Maintenance** > **System Status** > **Camera Info**. A higher number reflects a later release.

UPGRADE CAMERA FIRMWARE

Install the most recent firmware. Unless otherwise specified in the release notes, you do not need to upgrade to any firmware in between your current version and the most recent version available online.

NOTE: You must calibrate the sensor after upgrading the camera. For more information, go to "Sensor Calibration" on page 138.

NOTE: Preset, Look, and Custom Overlay files are preserved across upgrades to v6.2.3 or later.

NOTE: On Mac® computers with REDCINE-X PRO® installed, RED Watchdog mounts the SSD as Read-Only by default, which means that you are unable to write files (including firmware upgrade files) to the SSD. Change the **Mount** preference to **Read-Write** before attempting to copy firmware to the SSD.

1. Connect an SSD (RED MINI-MAG®) to your computer.
2. Download the most recent firmware for your camera from RED Downloads at www.red.com/downloads.
3. Unzip the firmware zip file.
4. Copy the **force_upgrade** folder and its contents to the top level of the SSD directory.
5. Eject or unmount the SSD, and then remove the SSD.
6. Ensure that the camera is turned off.
7. Insert the SSD with the force_upgrade folder into your camera.
8. Turn on the camera.

   The upgrade runs automatically.

   During upgrade, the fans run at high speed and the PWR and REC LEDs flash green. After approximately 15 seconds, the LEDs stop flashing and the camera turns off. Nothing displays on the external monitors during the upgrade.
9. After the camera turns off, remove the SSD and wait 10 seconds.
10. Turn on the camera.

    The camera may take 30 seconds or longer to upgrade all of the attached RED devices. During this time the PWR and REC LEDs flash green and nothing displays on the external monitors.
11. If this is your first time upgrading firmware, a pop-up menu opens with the Software License Agreement (SLA). Select **Agree**. If you do not agree to the SLA, the camera cannot be used. The SLA continues to display until it is accepted.

12. Verify that the firmware version listed matches the firmware version that you downloaded. For more information, go to "Verify Current Camera Firmware" on the previous page.
13. Reformat the SSD before recording.

CHAPTER 10:

CAMERA SYSTEM MAINTENANCE

All products are designed for rugged durability, but precision instruments demand proper care. Follow the instructions in this chapter to clean, maintain, and store your devices.

WARNING: DO NOT rinse or immerse the camera or other accessories in water. Keep dry at all times.

WARNING: DO NOT use soaps, detergents, ammonia, acetone, alkaline cleaners, abrasive cleaning compounds, or solvents. These substances may damage lens coatings and electronic circuitry.

WARNING: DO NOT use an excess of cleaning solution.

WARNING: DO NOT reuse swabs or wipes.

WARNING: DO NOT attempt to clean the sensor or optical cavity for any reason. If the sensor becomes dirty, submit a Support ticket at https://support.red.com.

WARNING: DO NOT attempt to modify, dismantle, or open the camera, lens, or other accessory as doing so may expose you to electric shock and serious injury. There are no user-serviceable parts inside. Alteration or repairs made to the camera, lens, or other accessory, except by a RED®authorized service facility, voids all warranties.

WARNING: Use caution with compressed air and gas dusters, since the high pressure, oily residue, cold air, particulates, and moisture may cause damage. You may use a filtered, non-residue gas duster to clean non-critical areas, such as around the fans and other recesses on the exterior of the camera. Damage to the camera or other components of the camera system caused by using compressed air or gas dusters is not covered under warranty.

WARNING: DO NOT use compressed air and gas dusters on the sensor or on any optics.

WARNING: DO NOT use compressed air and gas dusters on or around the integrated microphones on the front of the camera.

CAMERA BODY AND ACCESSORY EXTERIOR SURFACES

- Use a filtered, non-residue gas duster to clean non-critical areas, such as around the fans and other recesses on the exterior of the camera.
- Clean with a dry lint-free cloth. When cleaning your camera and accessories, remember that the devices are not waterproof and moisture can damage electronic circuitry.

STORAGE

RED recommends that you store the camera and accessories in the water-resistant cases available in the RED Store at www.red.com/store. These cases feature laser-cut foam to keep the camera and accessories secure.

WARNING: DO NOT store the camera or accessories in any place with extreme temperatures, direct sunlight, high humidity, severe vibration, or strong magnetic fields.

CLEAN EVF SCREEN

NOTE: This section describes only how to clean the screen on the DSMC2® RED EVF, and not how to clean the entire device.

This section explains how to clean the screen on the DSMC2 RED EVF. The screen is accessed by removing the DSMC2 RED EVF Modular Optical Block.

Use an ionized rubber air bulb to clean the screen on the DSMC2 RED EVF. If there are still particles on the screen after using an air bulb, gently wipe the screen with a rolled-up, particulate-free, non-abrasive optical-grade wipe.

NOTE: Cleaning the screen without first removing solid particles increases the risk of scratching the screen. As with many screens, any type of physical contact with the screen may scratch the surface.

PROHIBITED EVF SCREEN CLEANERS

DO NOT use any of the items listed below to clean the screen on the DSMC2 RED EVF. These products have not been tested on RED products and may cause damage or streaking.

- Compressed air
- Gas dusters
- Solvents
- Rubbing alcohol
- Isopropyl alcohol
- Windex®
- Third-party cleaning kits
- Pre-packaged lens cleaner containing any additives, such as detergent, anti-static compounds, or fragrance
- RED Microfiber Bag

WARNING: Damage to any screens or other components of the camera system caused by using prohibited cleaners is not covered under warranty.

CLEAN LCD SCREENS

NOTE: This section describes only how to clean the screen on each specified device, and not how to clean the entire device.

This section explains how to clean the screens on the following devices:

- RED PRO LCD
- RED Touch LCD
- RED PRO Touch LCD
- Camera Side LCD

APPROVED LCD SCREEN CLEANERS

Use only the following products to clean LCD screens:

- Ionized rubber air bulb
- Delkin Devices Sensor Solution®
- Lens swabs
- Dry optical wipes
- RED Microfiber Bag

NOTE: Before cleaning the screen with swabs or wipes and a cleaning solution, ALWAYS use an ionized rubber air bulb to remove any solid particles. Cleaning the screen without removing solid particles increases the risk of scratching the screen.

PROHIBITED LCD SCREEN CLEANERS

DO NOT use any of the items listed below to clean LCD screens. These products have not been tested on RED products and may cause damage or streaking.

- Compressed air
- Gas dusters
- Solvents
- Rubbing alcohol
- Isopropyl alcohol
- Windex
- Pancro Professional Lens Cleaner (or equivalent)
- Third-party cleaning kits
- Pre-packaged lens cleaner containing any additives, such as detergent, anti-static compounds, or fragrance

WARNING: Damage to any screens or other components of the camera system caused by using prohibited cleaners is not covered under warranty.

SCREEN STORAGE

Store any RED device with a screen in a RED Microfiber bag. Storing devices in a RED Microfiber bag preserves the superior quality of the specialized AR and AS coatings on the LCDs.

Hand wash and air-dry the RED Microfiber bag regularly.

WATER DAMAGE

If your device has come in contact with water or you suspect water damage, submit a Support ticket at https://support.red.com immediately.

WARNING: DO NOT attempt to power any device that may have water damage.

WARNING: DO NOT place the device in a container of rice, silica gel, or desiccant packets in an attempt to dry the device.

CHAPTER 11:

TROUBLESHOOT YOUR CAMERA

PERFORM A STRESS TEST

Perform a stress test before important projects to ensure the reliability and stability of your gear. A stress test subjects your camera system and equipment to the increased stress of prolonged operation. If any components are developing issues, this test will help identify those problems before you have an equipment failure during a major shoot.

1. Configure your camera.
2. Calibrate the sensor. For more information, go to "Sensor Calibration" on page 138.
3. Enable the Sensor Test Pattern. For more information, go to "Enable/Disable Sensor Test Pattern" on page 134.
4. Select the desired resolution.
5. Select the highest available frame rate.
6. Perform a secure format of the SSD.
7. Record a full SSD of footage.
8. Perform a secure format of the SSD.
9. Repeat Step 6 to Step 8 to test multiple SSDs.
10. If any errors occur, save a log file and submit a Support ticket at https://support.red.com.

NOTE: Problems or dropped frames found during the stress test display as “Errors” in the bottom of the user interface.

GENERAL TROUBLESHOOTING

FIRMWARE DOES NOT UPGRADE

SYMPTOM

- During an attempt to upgrade firmware, the PWR and REC LEDs flash red.
- After an attempt to upgrade firmware, the firmware version does not change.

POTENTIAL RESOLUTIONS

- After downloading the firmware upgrade file, ensure that you unzip the file before saving it to the SSD.
- Ensure that the “force_upgrade” folder is saved to the top level of the SSD, and not to a subfolder.

GENERAL: LENS MOUNT NOT FUNCTIONING

SYMPTOM

The lens mount is not functioning correctly, or is not communicating with the camera.

POTENTIAL RESOLUTIONS

- Perform a Hardware Rediscover. For more information, go to "Rediscover (Hardware Rediscover)" on page 135.
- Upgrade your camera firmware. For more information, go to "Upgrade Camera Firmware" on page 161.
- Reset your camera's default settings. For more information, go to "Reset Defaults" on page 135.

CAMERA DOES NOT RECOGNIZE LENS

SYMPTOM

The camera does not recognize the attached lens.

POTENTIAL RESOLUTIONS

- Ensure that the lens is compatible. For more information, go to "Lenses" on page 208.
- If using a PL lens, ensure that the camera is providing power to the lens: go to **Menu** > **Settings** > **Setup** > **Lens** and select the **Enable Power to Lens** check box.
- Detect the lens: go to **Menu** > **Settings** > **Setup** > **Lens** and select **Detect Lens**.
- Perform a Hardware Rediscover. For more information, go to "Rediscover (Hardware Rediscover)" on page 135.

CAMERA DISPLAYS N/A FOR APERTURE

SYMPTOM

The camera displays N/A for aperture when a lens is attached.

POTENTIAL RESOLUTIONS

- Ensure that your lens is completely locked in place.
- Remove your lens mount. Check the connection points for damage or debris. Install your lens mount.
- Perform a Hardware Rediscover. For more information, go to "Rediscover (Hardware Rediscover)" on page 135.
- Re-install your camera firmware.
- If your camera is on beta firmware, downgrade to the release build.
- If you are using a DSMC PL mount, go to **Menu** > **Settings** > **Setup** > **Lens** and ensure that power is enabled.

NOTE: Some lenses do not display the aperture information because they are incompatible. Some PL lenses do not have i-technology data.

CANNOT SEE MENUS ON LCD TOUCHSCREEN

SYMPTOM

The LCD touchscreen does not display menus.

POTENTIAL RESOLUTION

Double-tap the LCD touchscreen to exit Clean mode.

SCREEN FREEZES OR DOES NOT DISPLAY

SYMPTOM

The screen freezes or does not display.

POTENTIAL RESOLUTION

Perform a Hard Restore. For more information, go to "Perform a Hard Restore" on page 170.

INTERMITTENT MOTION JITTER

SYMPTOM

A slight, intermittent motion jitter displays on the monitor.

POTENTIAL RESOLUTIONS

If you calibrate the sensor using the Auto Calibration method, the calibration map updates in the background when camera settings change. The update may cause slight, intermittent motion jitter to the image on the monitor. The jitter characteristic only displays in live preview, and does not affect recorded footage. For more information on sensor calibration, go to "Sensor Calibration" on page 138.

LCD FLICKER

SYMPTOM

The LCD or monitor is flickering.

POTENTIAL RESOLUTIONS

- Set the LCD frequency to 60 Hz. For more information, go to "Frequency" on page 71.
- Use a different cable.
- Ensure cables are properly attached.

LCD BLANK AT STARTUP

SYMPTOM

When you turn on the camera, the LCD does not show any image.

POTENTIAL RESOLUTIONS

Turn off the camera. Wait at least three (3) seconds, and then turn the camera back on.

CANNOT USE TOUCHSCREEN

SYMPTOM

Cannot control the camera via the touchscreen or the Side LCD.

POTENTIAL RESOLUTIONS

- Perform a Hard Restore. For more information, go to "Perform a Hard Restore" on the next page.
- If you are using an external monitor, enable menus on the monitors and control the camera via the Side LCD:
  - Connect an SSD (RED MINI-MAG®) to your computer.
  - On the SSD, create a new folder, and name it **force_preset**.
  - Download the DSMC Toolkit from www.red.com/downloads.
  - Open the **Preset_Files** folder.
  - Open the folder that corresponds to the firmware version you are using.
  - Save the appropriate **enable_menus** file to the **force_preset** folder on your SSD.
  - Eject or unmount the SSD, and then remove the SSD.
  - Ensure that the camera is turned off.
  - Insert the SSD into your camera.
  - Turn on the camera. The camera automatically applies the preset.

NOTE: On Mac® computers with REDCINE-X PRO® installed, RED® Watchdog mounts the SSD as Read-Only by default, which means that you are unable to write files (including firmware upgrade files) to the SSD. Change the **Mount** preference to **Read-Write** before attempting to copy firmware to the SSD.

TIGHTEN DC IN CONNECTOR

SYMPTOM

The DC IN connector nut is loose.

POTENTIAL RESOLUTIONS

- Tighten the loose DC IN connector nut using a pair of heavy duty strong point tweezers.

WARNING: DO NOT OVERTIGHTEN.

- **Optional**: Add a small amount of Loctite® 222 (low strength thread locker) to the threads of the DC IN connector nut to prevent the connector from becoming loose again.

CAMERA DOES NOT TURN ON

SYMPTOM

The camera does not turn on (does not boot up), even when powered.

POTENTIAL RESOLUTIONS

- Remove all accessories and power the camera using the power adaptor.
- Perform a Hard Restore. For more information, go to "Perform a Hard Restore" on the next page.
- Remove all accessories and power the camera using the power adaptor.

PERFORM A HARD RESTORE

A common way to resolve camera firmware issues is to perform a Hard Restore. A Hard Restore functions like a System Restore in that it changes all settings to the factory default values.

To perform a Hard Restore, follow the instructions below:

1. With the camera turned off, hold the **PWR/REC** key on the camera for 20 seconds or until the fans turn at a high speed.
2. Release the **PWR/REC** key.

   The screen displays correctly.

   NOTE: User key settings reset as well as any other changes from the default settings.

IMAGE APPEARS GRAINY

SYMPTOM

Image or footage appears grainy.

POTENTIAL RESOLUTIONS

- Calibrate the sensor before recording additional clips. For more information, go to "Sensor Calibration" on page 138.
- Check the histogram to ensure proper exposure. Noise occurs if an image is overexposed or underexposed.
- Use the lowest REDCODE® compression possible for the settings you have selected.
- Use a higher resolution.
- Use Adaptive fan mode to regulate the camera temperature. Noise occurs when the temperature from the applied calibration map is not in sync.

BLACK AND WHITE IMAGE

SYMPTOM

The display shows that an image is in black and white, and the menus are still in color.

POTENTIAL RESOLUTIONS

- Check the Color Saturation setting. If the Saturation setting is set to a low value, change the Saturation to a higher value.
- Reset your camera’s default settings. For more information, go to "Reset Defaults" on page 135.

INCORRECT COLOR TEMPERATURE

SYMPTOM

The camera color temperature is off and the image looks warmer or cooler than normal.

POTENTIAL RESOLUTIONS

- Perform an auto white-balance. For more information, go to "White Balance" on page 65.
- Calibrate the sensor. For more information, go to "Sensor Calibration" on page 138.

TIMECODE OR GENLOCK DOES NOT FUNCTION

SYMPTOM

The SYNC, GEN, and/or TC light is red, yellow, or greyed out.

POTENTIAL RESOLUTIONS

- Ensure that your timecode or genlock device is compatible. For more information, go to "Compatible Timecode Devices" on page 160 and "Compatible Genlock Devices" on page 160.
- Use a different cable.
- Ensure that your timecode or genlock device settings match your project settings.
- Ensure that your timecode or genlock device is set to the correct source. For more information, go to "Timecode" on page 149 and "Genlock" on page 151.
- Ensure that your Sensor Sync Mode is set to **Genlock**. For more information, go to "Sensor Sync" on page 152.
- Set the ACN (Ambient Clockit Network) to Off.

CAMERA DOES NOT RECOGNIZE OLPF

SYMPTOM

Your camera does not recognize the OLPF.

POTENTIAL RESOLUTIONS

- Reinstall the OLPF. For more information, go to "Swap an Interchangeable OLPF" on page 40.
- Install a different OLPF.
- If your camera still does not recognize the OLPF, submit a Technical Support request at https://support.red.com.

POSSIBLE HOT PIXEL

SYMPTOM

Your camera displays a possible hot pixel.

EXPLANATION

There may not be an issue with the pixel itself. The sensor can display a hot pixel when the sensor calibration is outdated. Current camera settings and temperature can affect pixel calibration.

POTENTIAL RESOLUTIONS

- Delete all user-generated calibration files and recalibrate the sensor. For more information, go to "Sensor Calibration" on page 138.
- Upgrade your camera firmware. For more information, go to "Upgrade Camera Firmware" on page 161.
- Reset your camera’s default settings. For more information, go to "Reset Defaults" on page 135.
- Check your footage on a computer to confirm that the hot pixel is from the camera sensor, not your display monitor.
- If you determine that the camera sensor has a hot pixel, use the Pixel Masking tool in REDCINE-X PRO to remove the hot pixel until the issue gets resolved. For more information, see the REDCINE-X PRO Operation Guide, available at www.red.com/downloads.

NO MON-1 SIGNAL

SYMPTOM

The MON-1 port does not output a signal.

EXPLANATION

The secondary LCD/EVF port (on the side of the camera) and the MON-1 port cannot be used at the same time. For more information, go to "Monitor Preferences" on page 70.

POTENTIAL RESOLUTIONS

- If an LCD or EVF is connected to the secondary LCD/EVF port (on the side of the camera), remove the LCD or EVF.
- Ensure that HD-SDI monitoring/recording is set up correctly. For more information, go to "Record" on page 43.

ERROR MESSAGES

“CRITICAL FAILURE” OR “SERIOUS ERROR” MESSAGES

SYMPTOM

When you upgrade or turn on the camera, the display shows a message with the phrase “Critical Failure” or “Serious Error”.

POTENTIAL RESOLUTIONS

- Update the camera firmware to the latest release build available for download at www.red.com/downloads.
- Submit a Support ticket at https://support.red.com. Include the following with the request:
  - Log file. For more information, go to "Save a Log File" on page 133.
  - List of devices, lens, and third-party accessories that were attached when the error occurred.
  - Method for powering the camera when the error occurred (include battery types, power devices, and power cables).

PRESET COULD NOT BE APPLIED

SYMPTOM

The display shows the following message: “Preset Could Not Be Applied”.

POTENTIAL RESOLUTION

Turn off the camera, power it back up, and attempt to apply the preset that failed.

CANNOT CONTROL CAMERA EXTERNALLY

SYMPTOM

The camera displays the message “For reliable external control over Ethernet your camera’s hardware may need to be upgraded. Please contact your Bomb Squad representative”.

POTENTIAL RESOLUTIONS

If you see this message, submit a Support ticket at https://support.red.com to have your hardware upgraded. You will not be able to control the camera externally until the hardware is upgraded.

ERROR 0X00000020 OR ERROR 0X20

SYMPTOM

The display shows one of the following messages:

- Error 0x00000020. Please save log and send to RED Support.
- ERROR 0x20. Media integrity error. Please secure format the SSD. If the issue persists, save log file and contact RED Support with the log file, method of powering camera, and camera configuration.

POTENTIAL RESOLUTIONS

- Perform a secure format of the SSD. For more information, see the DSMC Media Operation Guide, available at www.red.com/downloads.
- Update the camera firmware to the latest release build available for download at www.red.com/downloads.
- Submit a Support ticket at https://support.red.com. Include the following with the request:
    - Log file. For more information, go to "Save a Log File" on page 133.
    - List of devices, lens, and third-party accessories that were attached when the error occurred.
    - Method for powering the camera when the error occurred (include battery types, power devices, and power cables).

ERROR 0X01D

SYMPTOM

The display shows the following message: "ERROR 0x01D. Possible hardware error. Please save log file and contact RED Support with the log file and camera configuration."

POTENTIAL RESOLUTIONS

Submit a Support ticket at https://support.red.com. Include the following with the request:

- Log file. For more information, go to "Save a Log File" on page 133.
- List of devices, lens, and third-party accessories that were attached when the error occurred.
- Method for powering the camera when the error occurred (include battery types, power devices, and power cables).

ERROR 0X11D

SYMPTOM

The display shows the following message: "Media integrity error. Please secure format the SSD. If the issue persists, save log file and contact RED Support with the log file, method of powering camera, and camera configuration."

POTENTIAL RESOLUTIONS

- Perform a secure format of the SSD. For more information, see the DSMC Media Operation Guide, available at www.red.com/downloads.
- Update the camera firmware to the latest release build available for download at www.red.com/downloads.
- Submit a Support ticket at https://support.red.com. Include the following with the request:
  - Log file. For more information, go to "Save a Log File" on page 133.
  - List of devices, lens, and third-party accessories that were attached when the error occurred.
  - Method for powering the camera when the error occurred (include battery types, power devices, and power cables).

CAMERA KEEPS PROMPTING BLACK SHADE MESSAGE

SYMPTOM

Your camera keeps prompting you to black shade the camera.

POTENTIAL RESOLUTIONS

- Ensure that you complete the sensor calibration process. For more information, go to "Sensor Calibration" on page 138.
- Go to **Menu** > **Settings** > **Maintenance** > **Calibrate** and select **user1 Calibration Map**. Click **Set**.
- Go to **Menu** > **Settings** > **Maintenance** > **Calibrate** and delete all user-created calibration maps. Then reset your camera’s default settings. For more information, go to "Reset Defaults" on page 135.

AUDIO BUFFER OVERFLOW WARNING

SYMPTOM

The error message "Audio Buffer Overflow" displays.

POTENTIAL RESOLUTIONS

- Update the camera firmware to the latest release build available for download at www.red.com/downloads.
- Perform a secure format of the SSD. For more information, see the DSMC Media Operation Guide, available at www.red.com/downloads.

  IMPORTANT: Ensure that data is backed up before formatting the media, since formatting erases all data on the SSD.
- Submit a Support ticket at https://support.red.com. Include the following with the request:
  - Log file. For more information, go to "Save a Log File" on page 133.
  - List of devices, lens, and third-party accessories that were attached when the error occurred.
  - Method for powering the camera when the error occurred (include battery types, power devices, and power cables).
  - List of file formats you were recording to before the error occurred (R3D, Apple ProRes, Avid DNxHD/HR).

PROXY BUFFER OVERFLOW WARNING

SYMPTOM

The error message "Proxy Buffer Overflow" displays.

POTENTIAL RESOLUTIONS

- Update the camera firmware to the latest release build available for download at www.red.com/downloads.
- Select a different recording file format and/or resolution from the Codec menu. For more information, go to "Select Record File Format" on page 114
- Submit a Support ticket at https://support.red.com. Include the following with the request:
  - Log file. For more information, go to "Save a Log File" on page 133.
  - List of devices, lens, and third-party accessories that were attached when the error occurred.
  - Method for powering the camera when the error occurred (include battery types, power devices, and power cables).
  - List of file formats you were recording to before the error occurred (R3D, Apple ProRes, Avid DNxHD/HR).

COOLING ADVISED MESSAGES

SYMPTOM

The display shows one of the following messages:

- LCD is getting hot. Cooling advised.
- LCD is hot. Cooling advised.

NOTE: The message identifies the affected LCD(s): LCD Top and/or LCD Left.

EXPLANATION

The LCD (screen) on the DSMC2 Touch 7.0" Ultra-Brite LCD may become hot to the touch in warm environments or when exposed to direct sunlight.

If the camera detects that the LCD is getting hot, the display shows this message:

- LCD is getting hot. Cooling advised.

Once the LCD becomes too hot, the display shows this message:

- LCD is hot. Cooling advised.

If you do not want to see these messages, you can disable them. For more information, go to "Disable LCD Temperature Warnings" on page 73.

POTENTIAL RESOLUTIONS

Decrease the temperature of the screen.

- Decrease the ambient temperature.
- Shade the screen.
- Angle the LCD so that the screen is not in direct sunlight.
- Remove the LCD from direct sunlight.

APPENDIX A: TECHNICAL SPECIFICATIONS

RED RANGER TECHNICAL SPECIFICATIONS

RED RANGER	
SPECIFICATION	**DESCRIPTION**
Sensor Type	MONSTRO® 35.4 Megapixel CMOS
Effective Pixels	8192 x 4320
Sensor Size	40.96 mm x 21.60 mm (Diagonal: 46.31 mm)
Dynamic Range	17+ stops
Max Data Rates	Up to 300 MB/s using RED MINI-MAG® (480GB, 512GB, 960GB & 1TB)
	Up to 225 MB/s using RED MINI-MAG (120GB & 240GB)
Max Frame Rates[1]	60 fps at 8K Full Format (8192 x 4320), 75 fps at 8K 2.4:1 (8192 x 3456) 60 fps at 7K Full Format (7168 x 3780), 75 fps at 7K 2.4:1 (7168 x 3024) 75 fps at 6K Full Format (6144 x 3240), 100 fps at 6K 2.4:1 (6144 x 2592) 96 fps at 5K Full Format (5120 x 2700), 120 fps at 5K 2.4:1 (5120 x 2160) 120 fps at 4K Full Format (4096 x 2160), 150 fps at 4K 2.4:1 (4096 x 1728) 150 fps at 3K Full Format (3072 x 1620), 200 fps at 3K 2.4:1 (3072 x 1296) 240 fps at 2K Full Format (2048 x 1080), 300 fps at 2K 2.4:1 (2048 x 864)
Playback Frame Rates (Project Time Base)	23.98, 24, 25, 29.97, 30, 47.95, 48, 50, 59.94, 60 fps, all resolutions
Best Available REDCODE® Settings[1]	5:1 REDCODE at 8K Full Format (8192 x 4320) and 24 fps 12:1 REDCODE at 8K Full Format (8192 x 4320) and 60 fps 2:1 REDCODE at 4K Full Format (4096 x 2160) and 24 fps 3:1 REDCODE at 4K Full Format (4096 x 2160) and 60 fps

RED RANGER	
SPECIFICATION	**DESCRIPTION**
REDCODE RAW Acquisition Formats[2]	8K Full Format (8192 x 4320), 2:1, 2.4:1, 16:9, 14:9, 8:9, 3:2, 6:5, 4:1, 8:1, and Ana 2x, 1.3x, 1.25x 7K Full Format (7168 x 3780), 2:1, 2.4:1, 16:9, 8:9, 6:5, 4:1, 8:1, and Ana 2x, 1.3x 6K Full Format (6144 x 3240), 2:1, 2.4:1, 16:9, 8:9, 3:2, 4:3, 6:5, 4:1, 8:1, and Ana 2x, 1.3x, 1.25x 5K Full Format (5120 x 2700), 2:1, 2.4:1, 16:9, 8:9, 4:3, 6:5, 4:1, 8:1, and Ana 2x, 1.3x 4K Full Format (4096 x 2160), 2:1, 2.4:1, 16:9, 8:9, 3:2, 4:3, 5:4, 6:5, 4:1, 8:1, 1:1, and Ana 2x, 1.3x 3K Full Format (3072 x 1620), 2:1, 2.4:1, 16:9, 3:2, 4:3, 5:4, 6:5, 4:1, 8:1, and Ana 2x, 1.3x 2K Full Format (2048 x 1080), 2:1, 2.4:1, 16:9, 3:2, 4:3, 5:4, 6:5, 4:1, 8:1, and Ana 2x, 1.3x
Apple® ProRes	ProRes 422 HQ, ProRes 422 and ProRes 422 LT at 4K (4096 × 2160) up to 30 fps ProRes 4444 XQ and ProRes 4444 at 2K (2048 × 1080) up to 120 fps ProRes 422 HQ, ProRes 422 and ProRes 422 LT at 2K (2048 × 1080) up to 120 fps
Avid® Codecs	DNxHR HQX at 4K (4096 × 2160) 12-bit up to 30 fps DNxHR HQ and SQ at 4K (4096 × 2160) 8-bit up to 30 fps DNxHR 444 at 2K (2048 × 1080) 12-bit up to 120 fps DNxHR HQ and SQ at 2K (2048 × 1080) 8-bit up to 120 fps DNxHD 444 and HQX (1920 × 1080) 10-bit up to 120 fps DNxHD HQ and SQ (1920 × 1080) 8-bit up to 120 fps
Construction	Aluminum Alloy
Weight	7.30 lbs (with Integrated Media Bay, PL Mount, and Gold Mount) 7.50 lbs (with Integrated Media Bay, PL Mount, and V-Lock)
Operating Temperature	0°C to 40°C (32°F to 104°F)
Storage Temperature	–20°C to 50°C (–4°F to 122°F)
Relative Humidity	0% to 85% non-condensing
Color Management	Supports 33×33×33, 32×32×32, 26×26×26, and 17×17×17 3D LUTs Variable number of 3D LUT outputs User programmable shaper 1D LUTs Tetrahedral interpolation, 16-bit processing
Audio	Integrated dual channel digital stereo microphones, uncompressed, 24-bit 48 kHz Integrated dual channel 5-pin XLR, uncompressed, 24-bit 48 kHz
Remote Control	External R.C.P. WiFi antenna with SMA connector Ethernet, RS232, and GPI Trigger

RED RANGER	
SPECIFICATION	**DESCRIPTION**
Monitor Outputs	3G-SDI (HD-SDI) and MON-1 1080p RGB or 4:2:2, 720p RGB or 4:2:2 SMPTE Timecode, HANC Metadata, 24-bit 48 kHz Audio
Monitor Options	DSMC2® RED Touch 4.7" LCD, DSMC2 RED Touch 7.0" LCD and DSMC2 RED EVF (OLED) with cable-free connection. RED Touch 9.0" LCD, RED Touch 7.0" LCD, RED Touch 5.0" LCD, RED PRO 7" LCD, DSMC2 Touch 7.0" Ultra-Brite LCD, BOMB EVF (OLED) and BOMB EVF (LCOS) compatible with DSMC2 LCD/EVF Adaptor A or DSMC2 LCD/EVF Adaptor D, and LCD/EVF cable.
REDCINE-X PRO Delivery Formats	4K: DPX, TIFF, OpenEXR (.RED via RRencode plugin) 2K: DPX, TIFF, OpenEXR (.RED via RRencode plugin) 1080p RGB 4:2:2, 720p 4:2:2 : QuickTime®, JPEG, Avid AAF, MXF 1080p 4:2:0, 720p 4:2:0 : H.264, .MP4
Video Editing Software Compatibility[3]	Adobe® Premiere® Pro, Avid Media Composer®, DaVinci Resolve®, Edius Pro®, Final Cut Pro®, Vegas Pro®

1. REDCODE values and max frame rates may vary based on selected acquisition format, aspect ratio, project time base, Look Around setting, and SSD. For more information, see the DSMC Media Operation Guide at www.red.com/downloads.
2. For more information on available acquisition formats, see the DSMC Media Operation Guide at www.red.com/downloads.
3. Third-party non-linear editing (NLE) applications may have limited compatibility with R3D files.

APPENDIX B:

MECHANICAL DRAWINGS

RED RANGER WITH V-LOCK

NOTE: Dimensions are shown in mm.

The optical axis height of the camera is 95.90 mm.

FRONT VIEW

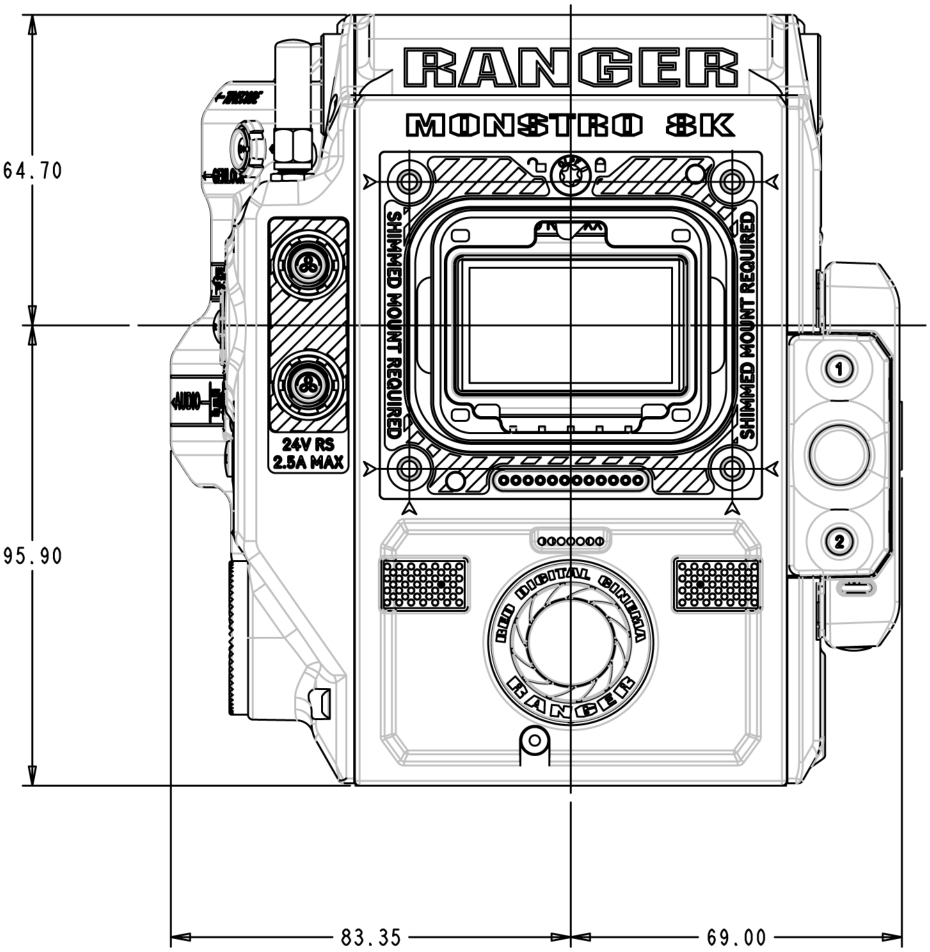

64.70
95.90
83.35
69.00
RANGER
MONSTRO 8K
SHIMMED MOUNT REQUIRED
SHIMMED MOUNT REQUIRED
24V RS
2.5A MAX
AUDIO
1
2
RED DIGITAL CINEMA
RANGER

Figure: Camera Front View

BACK VIEW

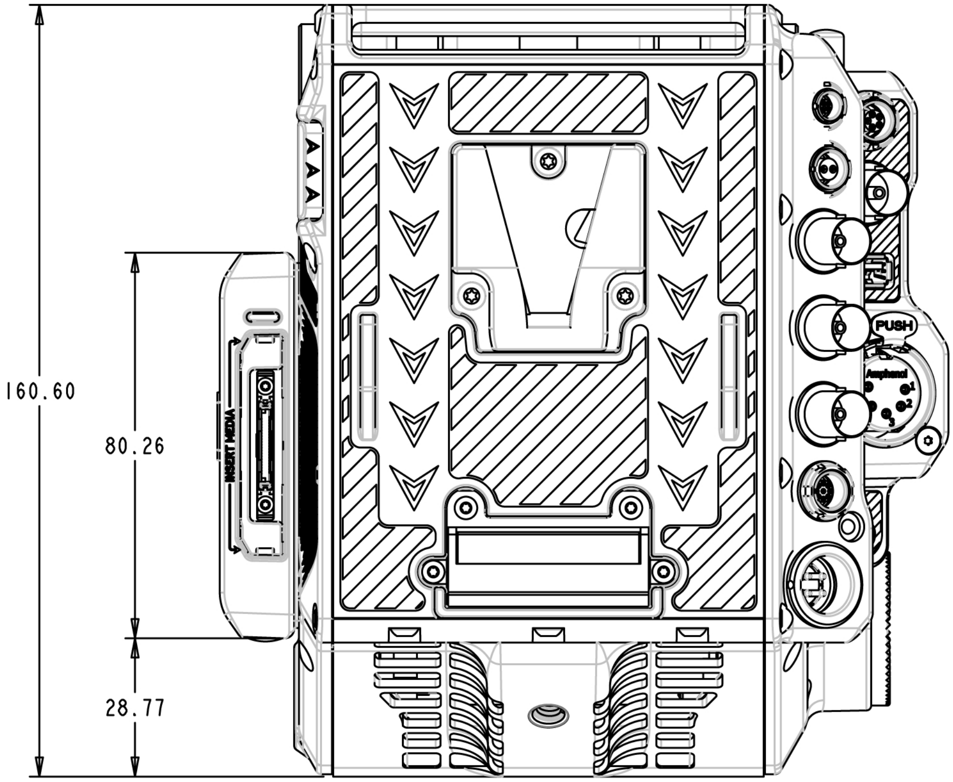

160.60
80.26
28.77
INSERT MEDIA
PUSH
Amphenol
1
2
3

Figure: Camera Back View

SIDE VIEW (RIGHT)

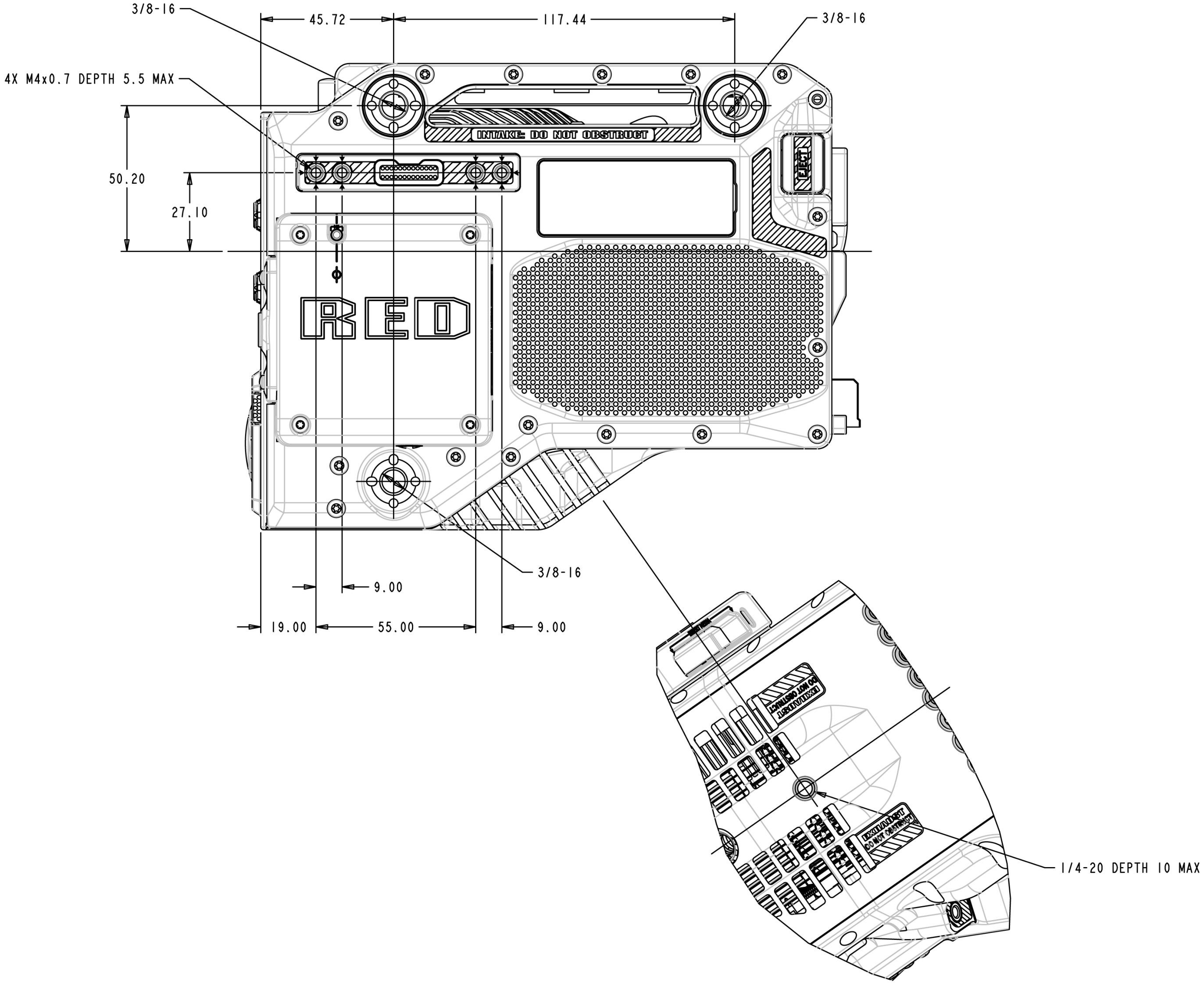

3/8-16
45.72
117.44
3/8-16
4X M4x0.7 DEPTH 5.5 MAX
50.20
27.10
INTAKE: DO NOT OBSTRUCT
EJECT
RED
3/8-16
9.00
19.00
55.00
9.00
1/4-20 DEPTH 10 MAX

Figure: Camera Side View (Right)

SIDE VIEW (LEFT)

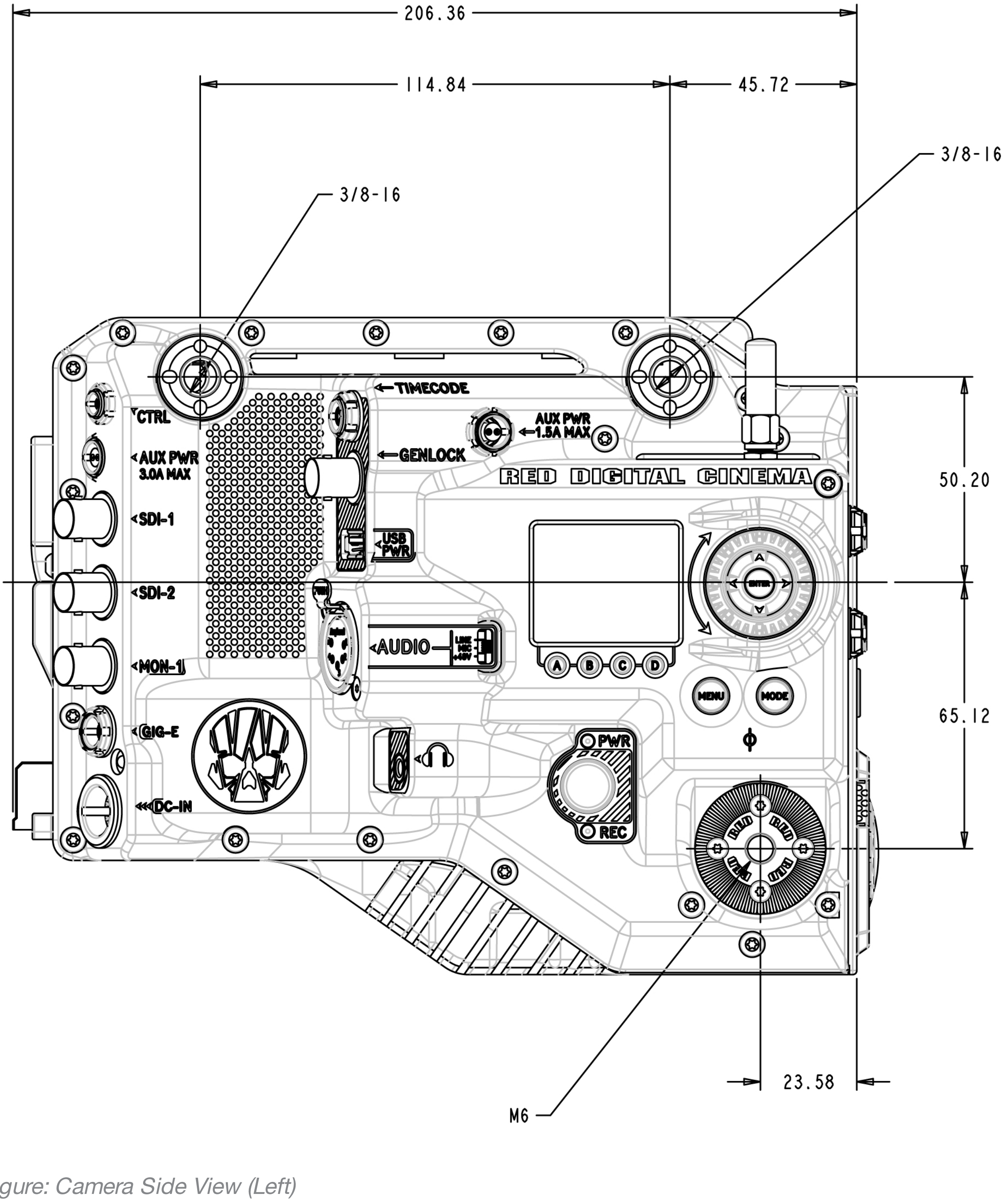

206.36
114.84
45.72
3/8-16
3/8-16
TIMECODE
CTRL
AUX PWR 1.5A MAX
AUX PWR 3.0A MAX
GENLOCK
RED DIGITAL CINEMA
50.20
SDI-1
USB PWR
SDI-2
ENTER
AUDIO
LINE
MIC
+48V
MON-1
A
B
C
D
MENU
MODE
65.12
GIG-E
PWR
DC-IN
REC
23.58
M6

Figure: Camera Side View (Left)

TOP VIEW

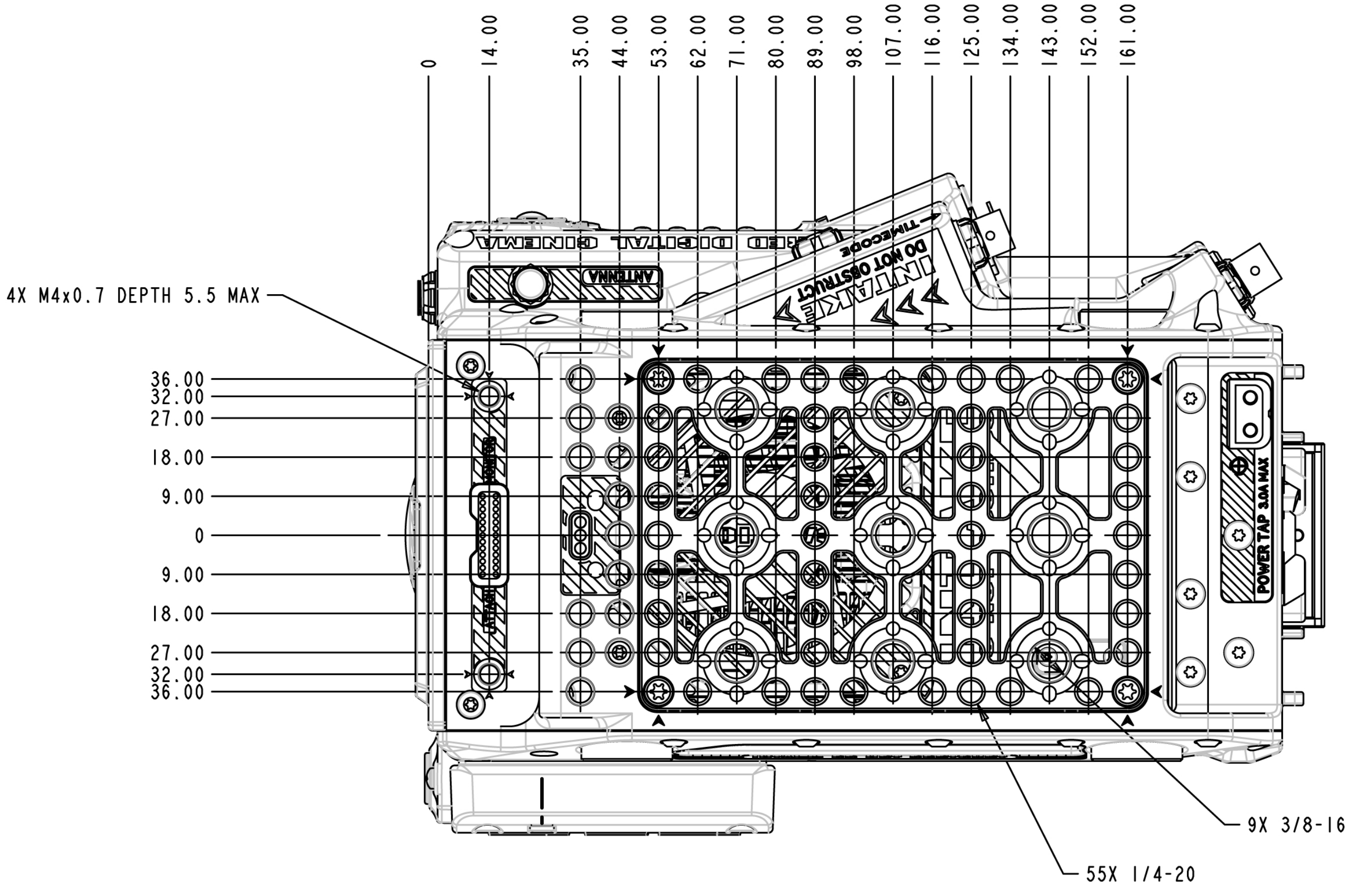

0
14.00
35.00
44.00
53.00
62.00
71.00
80.00
89.00
98.00
107.00
116.00
125.00
134.00
143.00
152.00
161.00
4X M4x0.7 DEPTH 5.5 MAX
36.00
32.00
27.00
18.00
9.00
0
9.00
18.00
27.00
32.00
36.00
RED DIGITAL CINEMA
ANTENNA
TIMECODE
DO NOT OBSTRUCT
INTAKE
POWER TAP 3.0A MAX
9X 3/8-16
55X 1/4-20

Figure: Camera Top View

BOTTOM VIEW

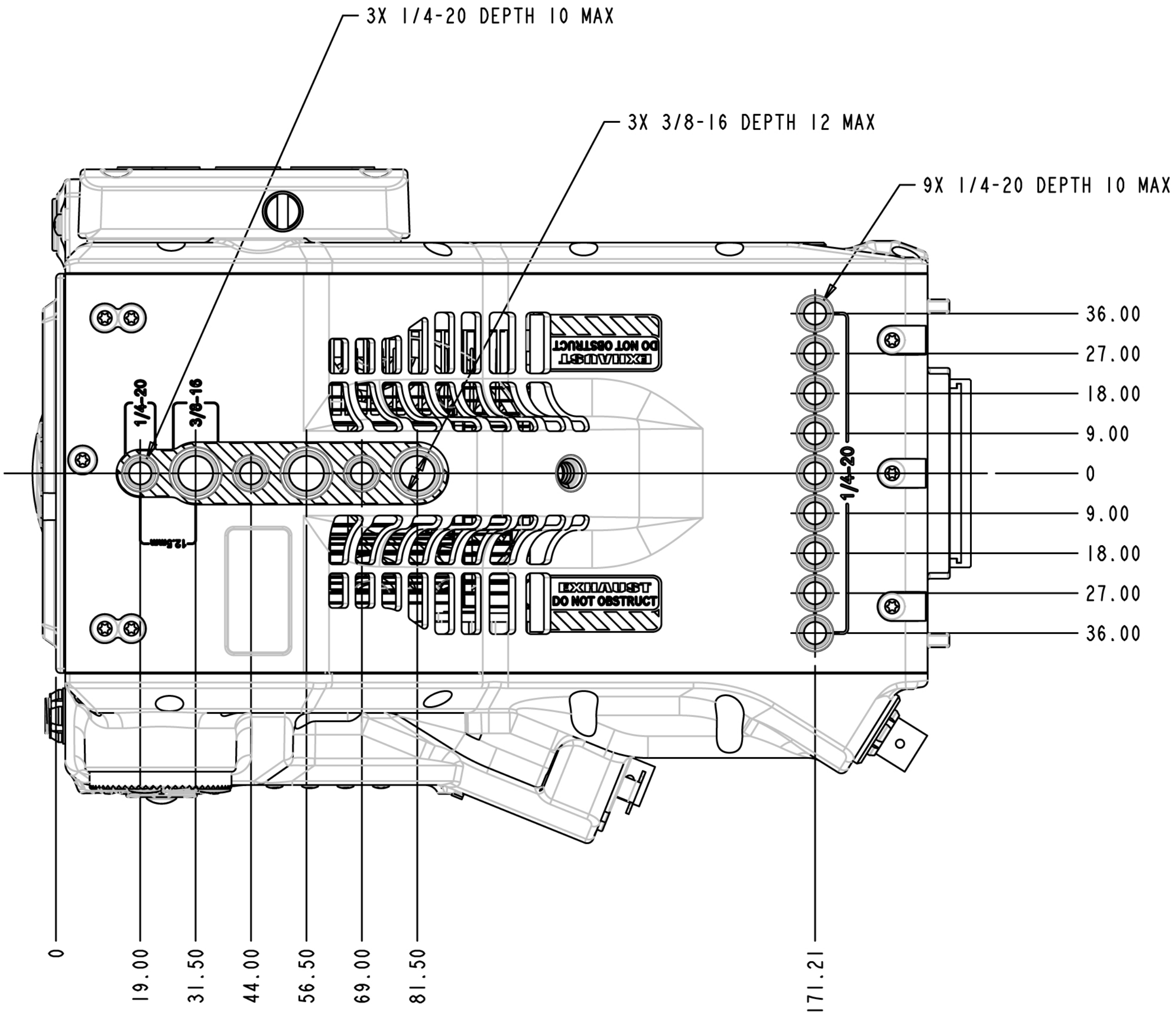

3X 1/4-20 DEPTH 10 MAX
3X 3/8-16 DEPTH 12 MAX
9X 1/4-20 DEPTH 10 MAX
EXHAUST
DO NOT OBSTRUCT
1/4-20
3/8-16
12.5mm
EXHAUST
DO NOT OBSTRUCT
1/4-20
36.00
27.00
18.00
9.00
0
9.00
18.00
27.00
36.00
0
19.00
31.50
44.00
56.50
69.00
81.50
171.21

Figure: Camera Bottom View

RED RANGER WITH GOLD MOUNT

NOTE: Dimensions are shown in mm.

The optical axis height of the camera is 95.90 mm.

FRONT VIEW

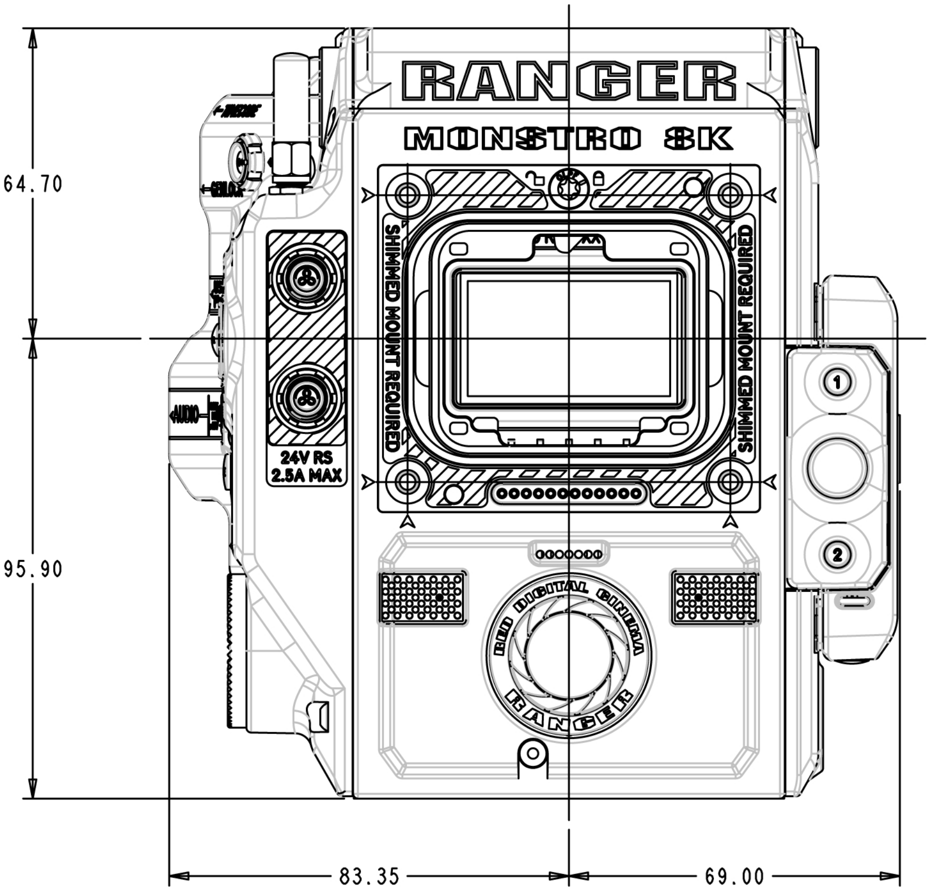

RANGER
MONSTRO 8K
SHIMMED MOUNT REQUIRED
SHIMMED MOUNT REQUIRED
GENLOCK
AUDIO
24V RS
2.5A MAX
1
2
RED DIGITAL CINEMA
RANGER
64.70
95.90
83.35
69.00

Figure: Camera Front View

BACK VIEW

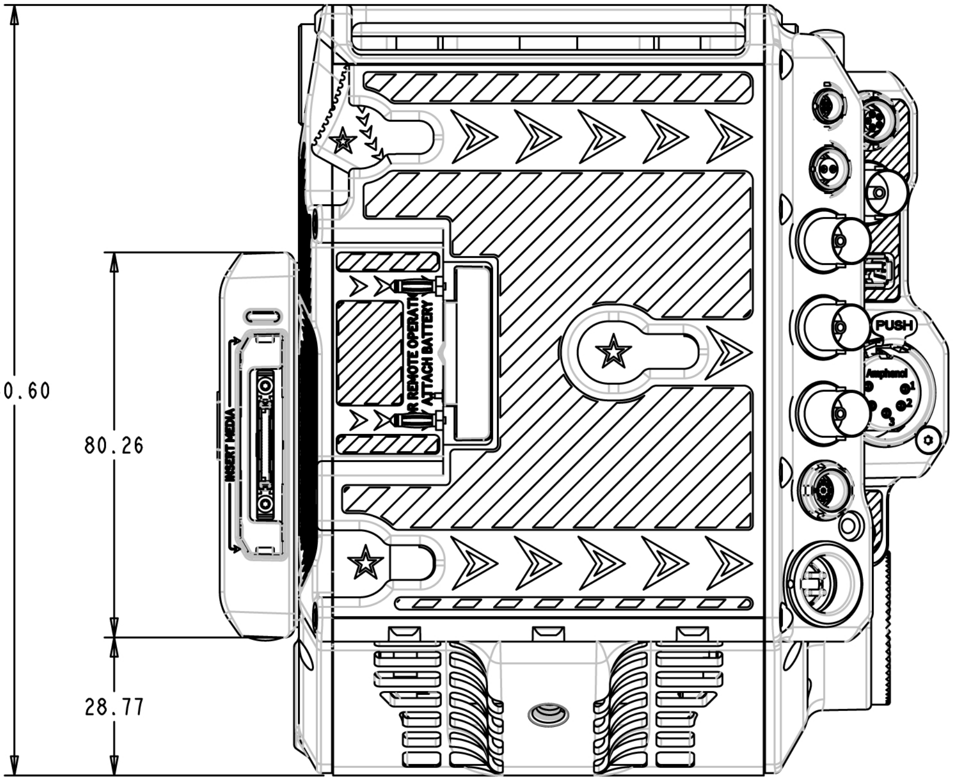

160.60
80.26
28.77
INSERT MEDIA
R REMOTE OPERATI
ATTACH BATTERY
PUSH
Amphenol
1
2
3

Figure: Camera Back View

SIDE VIEW (RIGHT)

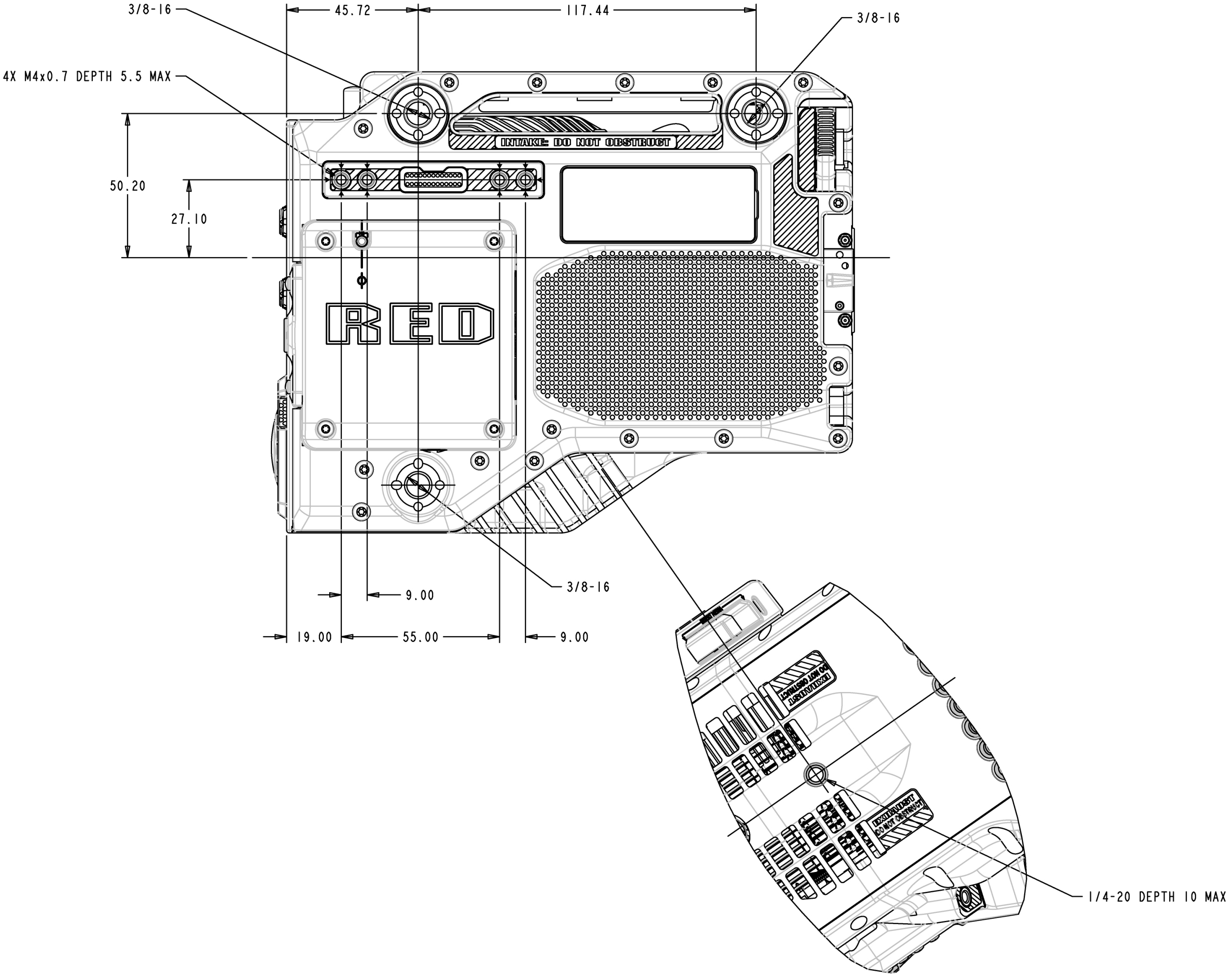

3/8-16
45.72
117.44
3/8-16
4X M4x0.7 DEPTH 5.5 MAX
INTAKE: DO NOT OBSTRUCT
50.20
27.10
RED
3/8-16
9.00
19.00
55.00
9.00
EXHAUST DO NOT OBSTRUCT
1/4-20 DEPTH 10 MAX

Figure: Camera Side View (Right)

SIDE VIEW (LEFT)

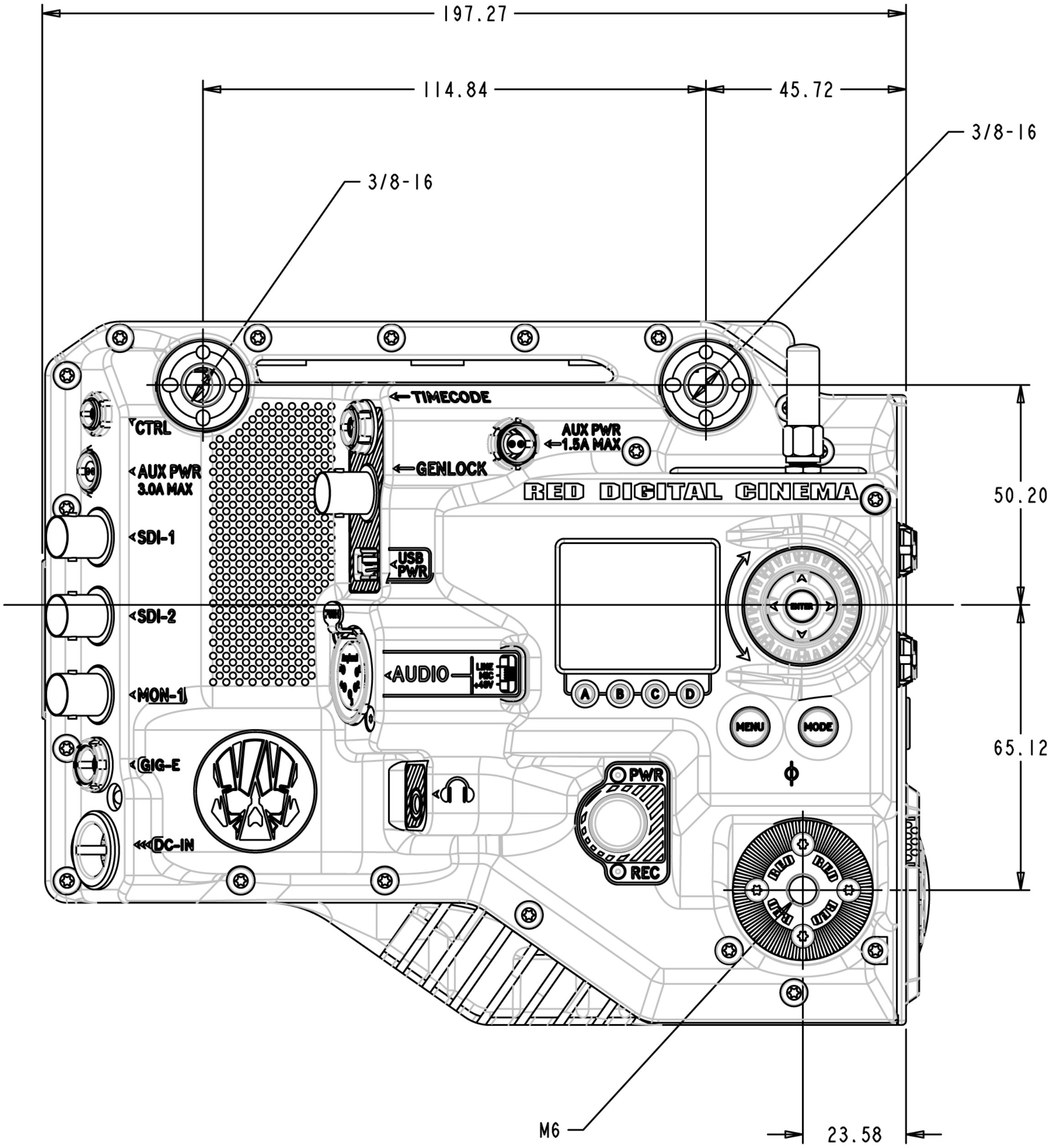

197.27
114.84
45.72
3/8-16
3/8-16
TIMECODE
CTRL
AUX PWR 1.5A MAX
AUX PWR 3.0A MAX
GENLOCK
RED DIGITAL CINEMA
50.20
SDI-1
USB PWR
SDI-2
AUDIO
LINE MIC +48V
MON-1
A
B
C
D
MENU
MODE
65.12
GIG-E
PWR
DC-IN
REC
M6
23.58

Figure: Camera Side View (Left)

TOP VIEW

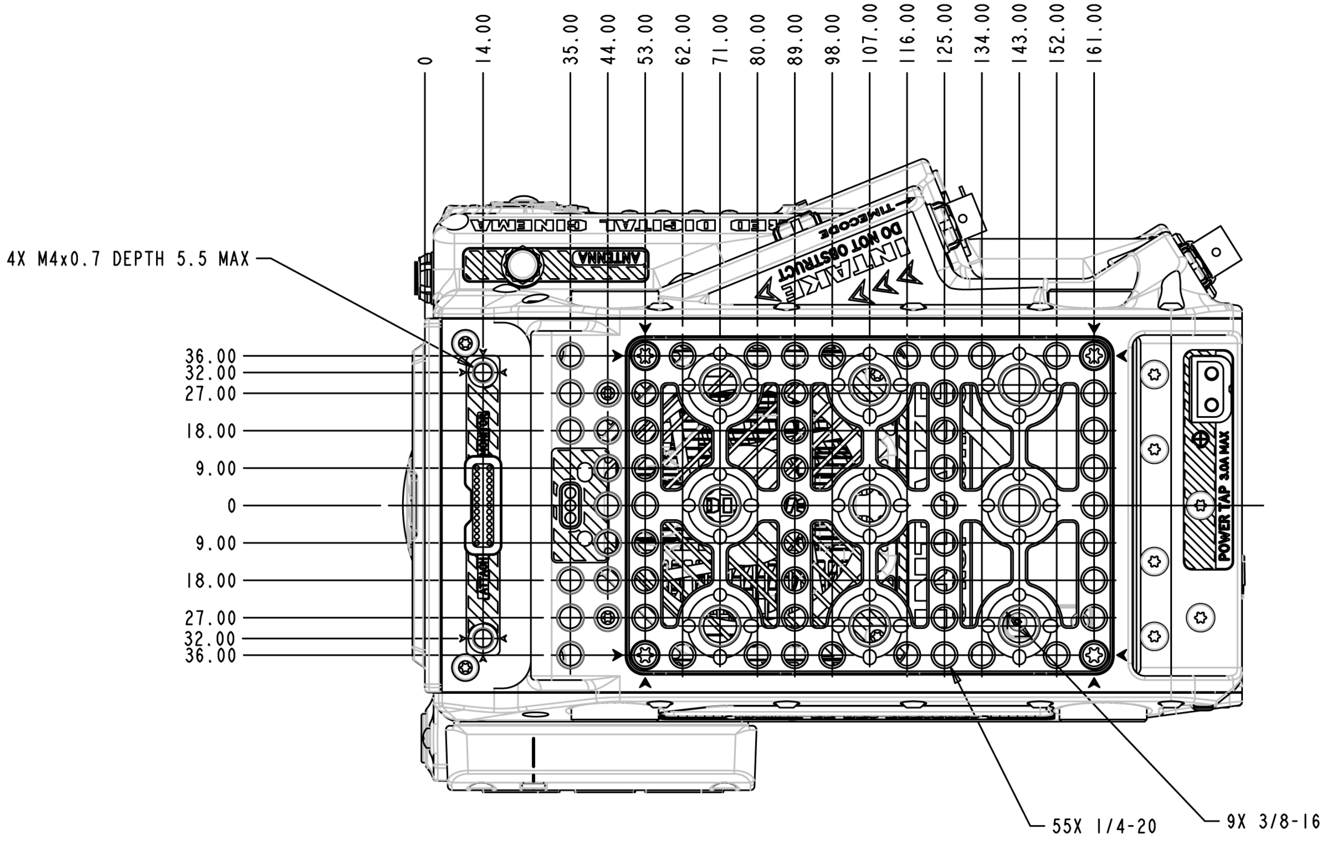

0
14.00
35.00
44.00
53.00
62.00
71.00
80.00
89.00
98.00
107.00
116.00
125.00
134.00
143.00
152.00
161.00
4X M4x0.7 DEPTH 5.5 MAX
36.00
32.00
27.00
18.00
9.00
0
9.00
18.00
27.00
32.00
36.00
ANTENNA
TIMECODE
DO NOT OBSTRUCT
INTAKE
POWER TAP 3.0A MAX
55X 1/4-20
9X 3/8-16

Figure: Camera Top View

BOTTOM VIEW

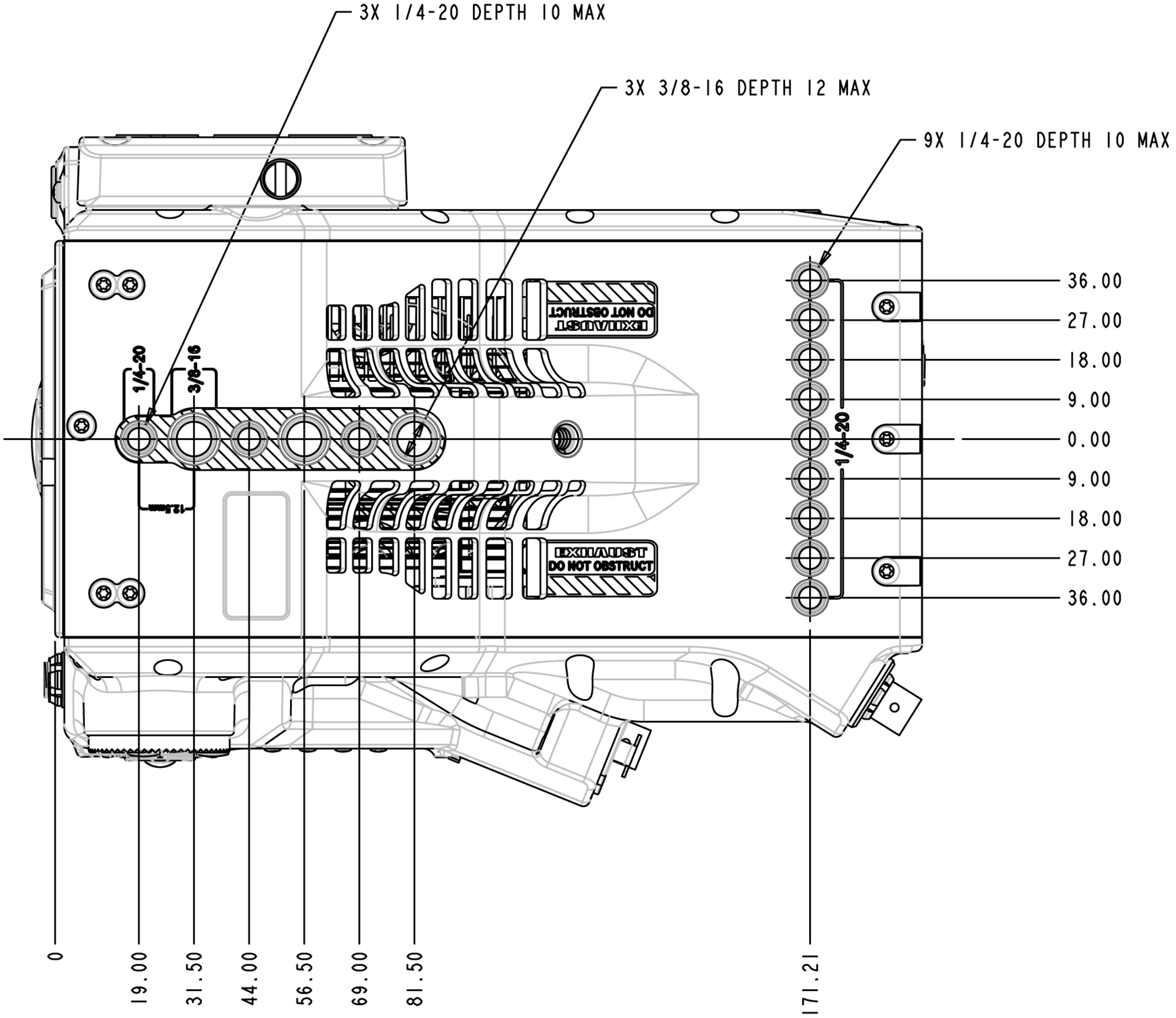

3X 1/4-20 DEPTH 10 MAX
3X 3/8-16 DEPTH 12 MAX
9X 1/4-20 DEPTH 10 MAX
1/4-20
3/8-16
12.5mm
EXHAUST DO NOT OBSTRUCT
EXHAUST DO NOT OBSTRUCT
1/4-20
36.00
27.00
18.00
9.00
0.00
9.00
18.00
27.00
36.00
0
19.00
31.50
44.00
56.50
69.00
81.50
171.21

Figure: Camera Bottom View

APPENDIX C: INPUT/OUTPUT CONNECTORS

This appendix provides pinout information for the input/output connectors on the camera.

NOTE: When connecting a cable to a connector, align the key and red marker on the cable connector with the corresponding key and marker on the device connection.

NOTE: Connector diagram images are for reference only. Diagrams are not to scale.

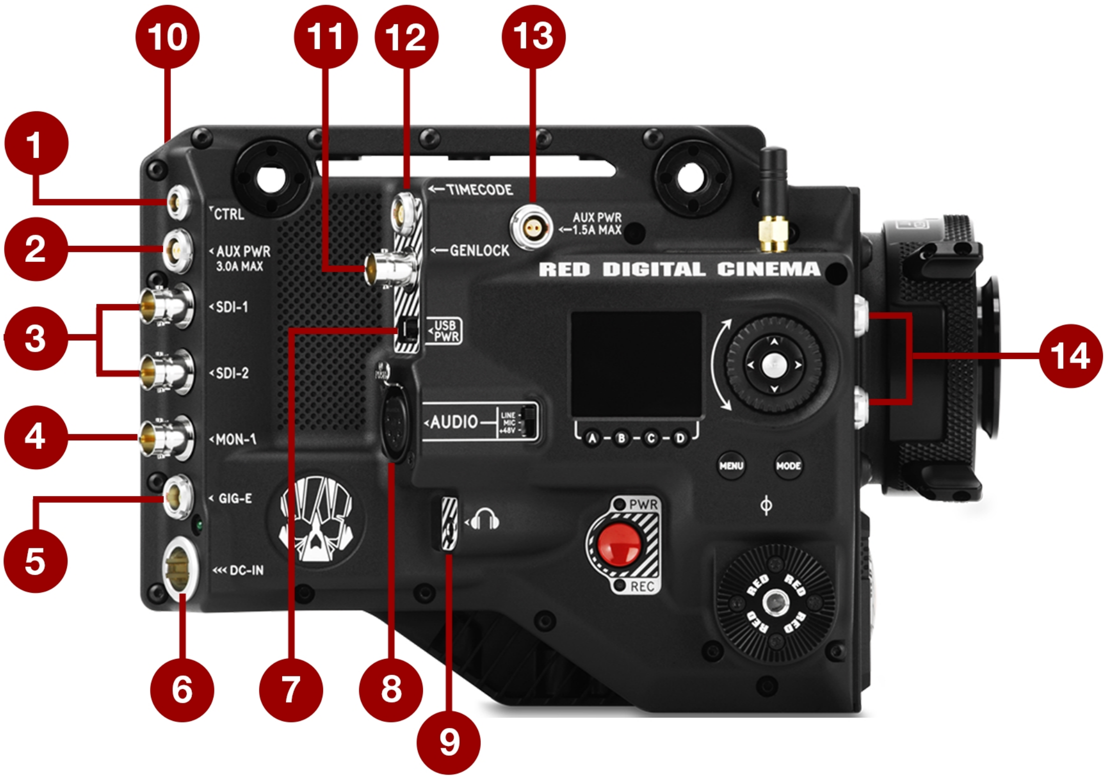

10
11
12
13
1
2
3
4
5
6
7
8
9
14
CTRL
AUX PWR 3.0A MAX
SDI-1
SDI-2
MON-1
GIG-E
DC-IN
TIMECODE
GENLOCK
USB PWR
AUX PWR 1.5A MAX
RED DIGITAL CINEMA
AUDIO
LINE MIC +48V
A B C D
MENU
MODE
PWR
REC

Figure: RED RANGER I/O

#	CONNECTOR	CONNECTOR TYPE	DETAILS
1	CTRL	4-pin 00B	"CTRL (RS232 Control)" on page 197
2	AUX PWR, 3.0A MAX	2-Pin 0B	"AUX Power 2-Pin 0B, 3.0A" on page 203
3	SDI 1 and 2	BNC	"3G-SDI (HD-SDI) Out" on page 195
4	MON-1	BNC	"MON-1" on page 196
5	GIG-E	9-pin 0B	"GIG-E (Ethernet)" on page 199
6	DC IN	4-pin 2B	"DC IN (Power Input)" on page 202

#	CONNECTOR	CONNECTOR TYPE	DETAILS
7	USB	USB 2.0 Type A (power only)	"USB Power" on page 204
8	AUDIO	5-pin XLR	"Audio" on page 201
9	Headphone Jack	3.5mm stereo	"Headphone" on page 201
10	POWER TAP	P-Tap 2-pin Female	"AUX Power (P-Tap)" on page 205
11	GENLOCK	BNC	"Genlock" on page 198
12	TIMECODE	5-Pin 0B	"Timecode" on page 198
13	AUX PWR, 1.5A MAX	2-Pin 0B	"AUX Power 2-Pin 0B, 1.5A" on page 204
14	24V RS 1 and 2	3-pin Fischer	"24V RS" on page 200

RECORD/MONITOR OUT PORTS

3G-SDI (HD-SDI) OUT

SDI-1 and SDI-2 output a cloned 3G-SDI signal.

A standard 75 ohm BNC connector provides the following output:

- Legal range of HD-SDI signals
- Broadcast specification 3G-SDI (HD-SDI) video output (default mode is Clean)
- Two (2) channels of embedded audio
- Time of Day and Edge timecode
- Record Tally flag
- Clip name information (as SMPTE RP-188 VITC2 HANC metadata)

The 3G-SDI (HD-SDI) output provides the formats described in the table below:

3G-SDI (HD-SDI) OUTPUT FORMATS[1]

VIDEO FEED[2]	FREQUENCY (HZ)[3]	SMPTE STANDARD
720p	23.98, 24.00, 25.00, 29.97, 30.00, 50.00, 59.94	SMPTE ST 292-1 (1.485 Gbps)
1080p 10-bit 4:2:2	23.98, 24.00, 25.00, 29.97, 30.00	SMPTE ST 292 (1.485 Gbps)
1080p 10-bit 4:2:2	50.00, 59.94, 60.00	3G-SDI SMPTE ST 424 (2.970 Gbps) SMPTE ST 425 (2.970 Gbps)

1. Ensure that you select a frequency supported by your monitor.
2. The output is progressive scan (p); it does not support progressive segmented frame (PsF) or interlaced (i) scan formats.
3. The frequency options depend on project time base. If you have a non-drop frame project time base (such as 24.00), you can select only non-drop frame frequencies. If you have a drop frame project time base (such as 23.98), you can select only drop frame frequencies.

75 OHM BNC CONNECTOR

PIN	SIGNAL	DESCRIPTION	DIRECTION
Center	3G-SDI	SMPTE ST 424	Out
Shield/Screen	GROUND	Camera ground	N/A

COMPATIBLE CABLE

- **790-0341**: RED® HD-SDI Cable (6')

MON-1

The MON-1 port provides an additional monitor feed that is separate from the SDI-1 and SDI-2 cloned feeds.

The MON-1 output provides the formats described in the table below:

MON-1 OUTPUT FORMATS[1]

VIDEO FEED[2]	FREQUENCY (HZ)[3]
720p	50.00, 60.00
1080p	24.00, 25.00, 30.00, 50.00, 60.00

1. Ensure that you select a frequency supported by your monitor.
2. The output is progressive scan (p); it does not support progressive segmented frame (PsF) or interlaced (i) scan formats.
3. Supports only non-drop frame frequencies.

75 OHM BNC CONNECTOR

PIN	SIGNAL	DESCRIPTION	DIRECTION
Center	SDI	SDI out	Out
Shield/Screen	GROUND	Camera ground	N/A

COMMUNICATION PORTS

CTRL (RS232 CONTROL)

The 4-Pin 00B CTRL Connector supports RS232 remote control for 3D camera communication and third-party metadata ingest applications. For more information, go to "BRAIN GPIO" on page 129.

The General Purpose Out (GPO) tally presents 3.3 V at a maximum of 0.04 A between pins 1 and 3. When used as a record tally, the rising edge of the pulse indicates start of record, falling edge represents end of record.

For more information about controlling the camera via RS232, download the R.C.P.™ SDK, available at www.red.com/developers.

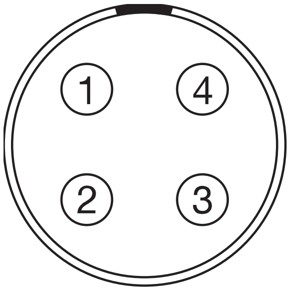


Figure: Front Face of the CTRL (RS232) Connector (Looking at the Camera)

4-PIN 00B CTRL CONNECTOR

PIN	SIGNAL	DESCRIPTION	DIRECTION
1	GROUND	Common ground	N/A
2	232 RX	RS232 RX	In
3	SS/GPO	Shutter sync/general purpose output	Out
4	232 TX	RS232 TX	Out

NOTE: Mating connector is FGG.00.304.CLAD.

COMPATIBLE CABLES

- **790-0154, 790-0643**: 3BNC-to-00 Sync Cable
- **790-0187, 790-0648**: 4-Pin 00B-to-Flying Lead
  - **White**: Ground
  - **Yellow**: RS232 RX
  - **Blue**: Shutter/sync, general purpose output
  - **Red**: RS232 TX
  - **Black**: Shield
- **790-0415**: RED Start/Stop Cable (14-Pin 1B to SYNC, CTRL, BNC)

GENLOCK

The 75 ohm BNC connector accepts incoming sync and genlock signals.

75 OHM BNC CONNECTOR

PIN	SIGNAL	DESCRIPTION	DIRECTION
Center	SYNC	SMPTE ST 274 RS 170A Tri-Level Sync	In
Shield/Screen	GROUND	Camera ground	N/A

TIMECODE

The LEMO EAG.0B.305.CLN connector supports SMPTE timecode input and output. Pins 2 and 3 can be used together to receive a balance SMPTE 12M serial timecode input. Pin 2 can be used by itself (leave pin 3 open) to receive a single-ended SMPTE 12M serial timecode input. Pin 5 is a timecode output.

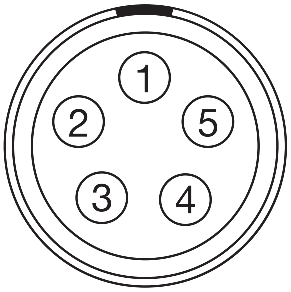


Figure: Front Face of Timecode (LEMO EAG.0B.305.CLN) Connector (Looking at the Camera)

LEMO EAG.0B.305.CLN CONNECTOR

PIN	SIGNAL	DESCRIPTION	DIRECTION
1	GROUND	Camera Ground	N/A
2	TIMECODE IN(S)	Timecode input - SMPTE single ended	In
3	N/A	No connection (NC)	N/A
4	+5 V OUT	+5 V out, 200 mA max	Out
5	TIMECODE OUT	SMPTE 12 M Timecode output	Out

NOTE: Mating connector is FHG.0B.305.CLAD.

COMPATIBLE CABLE

- **790-0212**: Pro I/O Time Code Cable 3'

GIG-E (ETHERNET)

The GIG-E 9-pin 0B connector provides a 1000BASE-T (IEEE 802.3ab) gigabit Ethernet connection for remote camera setup, master/slave camera communication, and external metadata ingest. Since the GIG-E connector does not support slower speeds (10BASE-T and 100BASE-T), ensure that any device you connect to supports 1000BASE-T.

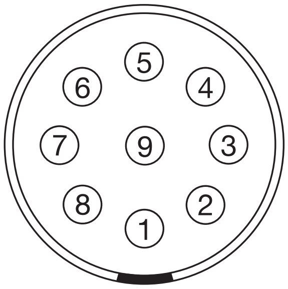


Figure: Front Face of the GIG-E Connector (Looking at the Camera)

9-PIN 0B GIG-E CONNECTOR

PIN	SIGNAL	DESCRIPTION	DIRECTION
1	BI_DC+	Data pair C+	N/A
2	BI_DC-	Data pair C-	N/A
3	BI_DD+	Data pair D+	N/A
4	BI_DD-	Data pair D-	N/A
5	BI_DA-	Data pair A-	N/A
6	BI_DA+	Data pair A+	N/A
7	BI_DB+	Data pair B+	N/A
8	BI_DB-	Data pair B-	N/A
9	N/A	Do not connect	N/A

NOTE: Mating connector is FGG.0B.309.CLAD.

COMPATIBLE CABLES

- **790-0159**: RED GIG-E Straight-to-CAT5E Ethernet Cable (9')
- **790-0557, 790-0655**: RED GIG-E Right-to-CAT5E Ethernet Cable (9')
- **790-0163**: Master/Slave Gig-E Cable (4')

24V RS

The two (2) Fischer 3-pin 102 connectors supply a combined 24V power out at a maximum sustained current draw of 2.5A. Each connector also includes a run/stop (R/S) trigger input. To operate the contact closure style trigger, short Pin 3 (R/S) to Pin 1 (ground).

When the camera is powered by an on-board battery or DC-IN with less than 24V input, the connector output is 24V (regulated). When the camera is powered by DC-IN with more than 24V input, the connector output matches the camera input voltage.

WARNING: DO NOT apply voltage to Pin 3 (R/S).

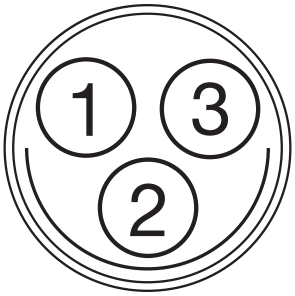


Figure: 24V RS (Looking at the Connector)

FISCHER 3-PIN CONNECTOR			
PIN	**SIGNAL**	**DESCRIPTION**	**DIRECTION**
1	GROUND	Common ground	N/A
2	+24 V OUT	+24 V out, 2.5A max (shared between the connectors)	Out
3	R/S	Active Low to start/stop record (3.3V pull up)	In

CONTACT CLOSURE STYLE TRIGGER BUTTON CIRCUIT (24V RS)

The diagram below shows the contact closure style trigger button circuit on the 24V RS connector.

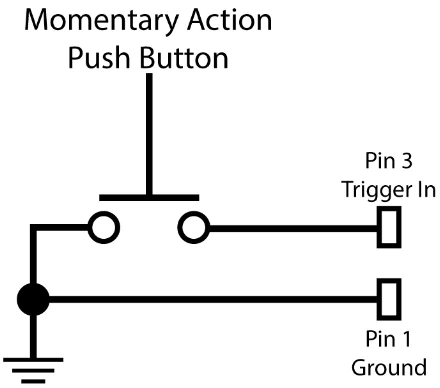


Figure: Contact Closure Style Trigger Button Circuit Diagram (24V RS)

AUDIO PORTS

AUDIO

The 5-pin XLR connector provides input for two (2) audio channels. Use the adjacent Audio switch to set the audio channels to line in (Line), Microphone level in (Mic), or microphone level in with 48 V 10mA phantom power (+48V). The switch controls both channels together; the channels cannot be controlled independently.

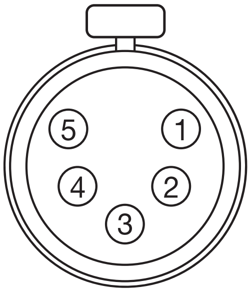


Figure: Front Face of Audio Input (5-Pin XLR) Connector (Looking at the Camera)

5-PIN XLR CONNECTOR

PIN	SIGNAL	DESCRIPTION	DIRECTION
1	GROUND	Camera ground	N/A
2	CH1_P	Channel 1 (left), positive voltage	In
3	CH1_N	Channel 1 (left), negative voltage	In
4	CH2_P	Channel 2 (right), positive voltage	In
5	CH2_N	Channel 2 (right), negative voltage	In

HEADPHONE

The 3.5mm stereo jack provides two (2) channels of audio for monitoring. For maximum quality, use high impedance headphones.

HEADPHONE JACK

PIN	SIGNAL	DESCRIPTION	DIRECTION
TIP	LEFT	Left channel audio	Out
RING	RIGHT	Right channel audio	Out
SLEEVE	GND	Camera ground	N/A

POWER PORTS

DC IN (POWER INPUT)

The 4-Pin 2B connector accepts DC input power from 11.5 V DC to 32 V DC. A built-in power conditioner protects against reverse-polarity connections, electrostatic discharge (ESD), undervoltage, overvoltage, and overcurrent.

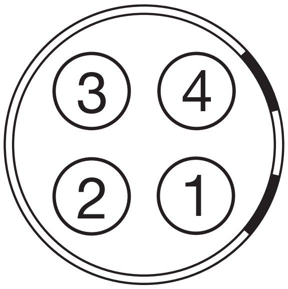


Figure: Front Face of the DC IN Power Input Connector (Looking at the Camera)

4-PIN 2B DC INPUT CONNECTOR

PIN	SIGNAL	DESCRIPTION
1	N/A	No connection (NC)
2	N/A	No connection (NC)
3	VIN	Power input, +11.5 to +32 V DC
4	GROUND	Power return (camera ground)

NOTE: The mating connector is FGJ.2B.304.CLLD62Z (LEMO).

COMPATIBLE CABLES

- **790-0665**: 3-PIN XLR-TO-4-PIN 2B POWER CABLE (10')

AUX POWER 2-PIN 0B, 3.0A

The 2-Pin 0B connector (LEMO EEG.0B.302.CLL) supplies unregulated (+) 11.5 to 17 VDC battery pass-through power. The maximum sustained current draw is 3.0A.

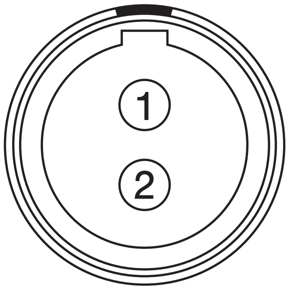


Figure: Front Face of Connector (Looking at the Camera)

LEMO EEG.0B.302.CLL CONNECTOR

PIN	SIGNAL	DESCRIPTION	DIRECTION
1	GROUND	Common ground	N/A
2	+11.5 to +17 VDC	+11.5 to 17 VDC unregulated battery pass-through power	Out

NOTE: Mating connector is FGG.00.302.CLAD35Z.

COMPATIBLE CABLE

- **790-0410**: RED W.M.D. Power Cable 2-Pin 1B to 2-Pin 0B (18")

AUX POWER 2-PIN 0B, 1.5A

The 2-Pin 0B connector (LEMO EEG.0B.302.CLL) supplies unregulated (+) 11.5 to 17 VDC battery pass-through power. The maximum sustained current draw is 1.5A.

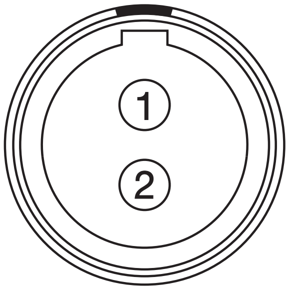


Figure: Front Face of AUX PWR Connector (Looking at the Camera)

LEMO EEG.0B.302.CLL CONNECTOR

PIN	SIGNAL	DESCRIPTION	DIRECTION
1	GROUND	Common ground	N/A
2	+11.5 to +17 VDC	+11.5 to 17 VDC unregulated battery pass-through power	Out

NOTE: Mating connector is FGG.00.302.CLAD35Z.

COMPATIBLE CABLE

- **790-0410**: RED W.M.D. Power Cable 2-Pin 1B to 2-Pin 0B (18")

USB POWER

The USB power out connector supplies 5 V of power. The maximum sustained current draw is 1.5A.

NOTE: The USB connector only offers power out, and does NOT support USB communication.

AUX POWER (P-TAP)

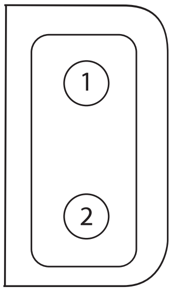


Figure: P-Tap Connector (Looking at Camera)

The AUX power out connector features an industry-standard P-Tap connector and supplies conditioned VBATT at a maximum of 3.0A of power.

2-PIN P-TAP CONNECTOR

PIN	SIGNAL	DESCRIPTION	DIRECTION
1	GROUND	Common ground	N/A
2	+11.5 to +17 VDC	+11.5 to 17 VDC unregulated battery pass-through power	Out

APPENDIX D:

LENS MOUNTS AND LENSES

LENS MOUNTS

This section describes camera lens mounts. Camera mounts may be configured with 19mm rods to accommodate most cinematography lenses, matte boxes, and follow focus systems.

RED recommends only using the RED RANGER Shimmed PL Mount with the RED RANGER. Other RED lens mounts are mechanically compatible, but may cause focus accuracy issues.

WARNING: All lenses are hot swappable. However, lens mounts are NOT HOT SWAPPABLE, meaning you cannot remove or install lens mounts while the camera is turned on. Before installing or removing lens mounts, you MUST turn off the camera. Failure to do so may result in damage to the lens mounts or camera that is not covered under warranty.

REMOVE A LENS MOUNT

NOTE: You can change lens mounts in the field. However, RED® recommends that you change lens mounts only in a dust-free environment.

REQUIRED TOOL(S): T20 TORX® driver

1. Turn off the camera.
2. Attach the camera to a stable platform or position the camera on a clean and level work surface so that the lens mount screws are accessible.
3. Remove the lens and any devices, cables, or other accessories that might interfere with removing the lens mount.
4. Depending on the lens mount, you may need to turn the locking ring slightly counter-clockwise so that you can access the lens mount screws.
5. Loosen and remove the four (4) M4x0.7 x 8 mm lens mount screws in a cross pattern (“X” pattern) using a T20 TORX driver.

   NOTE: Some lens mounts have captive screws that are not removable.

   NOTE: Screw removal may require a large handle T20 TORX driver and additional leverage.
6. Remove the lens mount from the camera.

INSTALL A LENS MOUNT

NOTE: You can change lens mounts in the field. However, RED recommends that you change lens mounts only in a dust-free environment.

REQUIRED TOOL(S): T20 TORX driver

1. Ensure that the camera is turned off and remove any accessories or cables that may interfere with installation.
2. Inspect the gold electrical contact pins on the front of the camera and the gold contact pads on the rear of the lens mount to ensure that they are free of any contamination.
3. Align the lens mount on the front of the camera. The camera connection pins must align with the lens mount pins.
4. Depending on the lens, you may need to turn the locking ring slightly counter-clockwise so that you can access the lens mount screws.
5. Replace and loosely tighten the four (4) M4x0.7 x 8 mm lens mount screws in a cross pattern (“X” pattern) using a T20 TORX driver.

   WARNING: DO NOT FULLY TIGHTEN.

   NOTE: Some lens mounts have captive screws that are not removable.
6. Tighten the four (4) lens mount screws evenly in a cross pattern (“X” pattern) using a T20 TORX driver. DO NOT exceed 350 in-oz, or damage may occur.

   WARNING: DO NOT OVERTIGHTEN.
7. After installation, a hardware rediscover or firmware upgrade may be required. To perform a hardware rediscover, go to **Menu** > **Settings** > **Maintenance** > **Rediscover**. A system reboot is required after a hardware rediscover.

   NOTE: If you need to replace any screws, submit a Support ticket at https://support.red.com.

LENSES

This section describes lenses that are compatible with the RED RANGER Shimmed PL Mount. Other lenses and lens mounts may be used with the RED RANGER, but may cause focus accuracy issues.

To avoid vignetting, use standard full frame PL mount lenses.

NOTE: Lenses are hot swappable.

LENS WEIGHT AND LENS SUPPORT

Use a lens support system when mounting heavy or long lenses to your camera.

When mounting a heavy or long lens, ensure that the full weight of the lens is never directly on the camera or lens mount. Mount the lens to the support system first, and then carefully mount the lens to the camera.

WARNING: Failure to use lens supports appropriate for the lens and camera setup may lead to damage of the camera and lens mount. Any damage caused by not using a lens support system is not covered under warranty.

POSITIVE LOCK (PL) LENSES

This section describes the appropriate method for attaching and detaching PL lenses. For more information, refer to the original manufacturer’s instructions. This section also lists lenses supported by the camera PL mounts.

WARNING: ALWAYS protect your equipment, when it is not in use, by replacing lens caps and mount caps.

ATTACH PL LENSES

1. Rotate the locking ring counter-clockwise to release the camera mount cap.
2. Remove the rear lens cap and the camera mount cap.
3. Align the key and contact pads (if present) on the PL lens with the key and connector pins on the camera PL mount.
4. Insert the lens into the camera PL mount.
5. Rotate the locking ring clockwise to secure the lens in place.

DETACH PL LENSES

1. Rotate the locking ring counter-clockwise to release the PL lens.
2. Remove the PL lens from the camera PL mount.
3. Replace the rear lens cap and camera mount cap when the lens is not in use.

CAMERA PL MOUNT SUPPORTED LENSES

The RED PL lens mount is compatible with most standard PL mount cinema lenses and devices.

WARNING: Using a non-standard PL mount lens or device with a camera PL mount may damage the camera and lens mount. Any damage caused by not using a standard PL mount lens or device is not covered under warranty.

FUJINON T2.9 CABRIO PREMIER PL LENSES

NOTE: The VTR switch on the lens is mapped to Record: Toggle by default. The VTR switch can be mapped to another key.

NOTE: Fujinon lenses running older versions of lens firmware might not send correct data to the camera.

The following Fujinon® T2.9 Cabrio Premier PL lenses are compatible with all camera PL mounts, but must be powered externally and configured a specific way:

- Fujinon 14-35mm T2.9 Cabrio Premier PL
- Fujinon 19-90mm T2.9 Cabrio Premier PL

To set up the Fujinon T2.9 Cabrio Premier PL lenses, follow the instructions below. Refer to the manufacturer's operation manual for detailed information about setting up and using the lens.

1. Attach the lens to the camera PL mount.
2. Ensure that the lens has lens firmware v6.4 or later (to check version in the camera, go to **Menu** > **Settings** > **Setup** > **Lens** > **Lens Info**). Contact the manufacturer for lens firmware.
3. On the lens, set the **Camera Communication** switch to **On**.
4. On the lens, set the **LDS, /i Select** switch to **Off**.
5. Connect an external power source to the lens.
6. In the camera, to **Menu** > **Settings** > **Setup** > **Lens**.
7. Deselect the **Enable Power to Lens** check box.

   NOTE: This option is only available when a camera PL mount is attached to the camera.
8. The lens should be successfully connected. However, if lens data does not display within 10 seconds, go to **Menu** > **Settings** > **Setup** > **Lens** and select **Detect Lens**.

CANON PL MOUNT LENSES

The following Canon PL mount lenses are compatible with all camera PL mounts, but must be configured a specific way:

- Canon CN7x17 KAS S Cine-Servo 17-120mm T2.95
- Canon CN20x50 IAS H Cine-Servo 50-1000mm

Requirements for using these Canon PL mount lenses:

- The lens requires lens firmware v6.4 or later; contact the manufacturer for lens firmware.
- In the camera, go to **Menu** > **Settings** > **Setup** > **Lens**, and select the **Enable Power to Lens** check box.
- RED recommends using an external battery for the lens, since the lens mount provides a limited supply of power to the lens.

APPENDIX E:
DEFAULT KEY FUNCTIONS

DEFAULT KEYS

ITEM	KEY	FUNCTION
Camera BRAIN®	Record Full Press	Record: Toggle
	GPI In High	Record: Start
	GPI In Low	Record: Stop
Media Bay (Side SSD)	Record Full Press	Record: Toggle/Multi-Shot Start
	Record Full Release	Record: Multi-Shot Stop
	Record Half Press	AF: Start
	User 1+2 Press	Eject Media
LCD (Primary and Secondary)	Up Press	Br. Up (Increase Brightness)
	Down Press	Br. Down (Decrease Brightness)
	User 1 Press	Magnify: Toggle
	User 2 Press	Exposure Check: Toggle
	User 1+2 Press	LCD: Toggle Lock
EVF (Primary and Secondary)	User 1 Press	Magnify: Toggle
	User 2 Press	Exposure Check: Toggle

ITEM	KEY	FUNCTION
DSMC2® SIDEKICK™	User A Press	AF Mode: Cycle
	User B Press	WB: Auto Calc
	User C Press	Magnify: Toggle
	User D Press	Exposure Check: Toggle
	User A+D Press	SM: Toggle Key Lock
	Nav Menu Press	Navigation: Menu
	Nav North Press	Navigation: Up
	Nav South Press	Navigation: Down
	Nav East Press	Navigation: Right
	Nav West Press	Navigation: Left
	Nav Enter Press	Navigation: Select
	Rotary CW	Navigation: CW
	Rotary CCW	Navigation: CCW

ITEM	KEY	FUNCTION
DSMC2 Side Handle	User A Press	AF Mode: Cycle
	User B Press	WB: Auto Calc
	User C Press	Magnify: Toggle
	User D Press	Exposure Check: Toggle
	Nav Menu Press	Navigation: Menu
	Nav North Press	Navigation: Up
	Nav South Press	Navigation: Down
	Nav East Press	Navigation: Right
	Nav West Press	Navigation: Left
	Nav Enter Press	Navigation: Select
	Rotary Side CW (Iris Control Wheel)	Iris: Open
	Rotary Side CCW (Iris Control Wheel)	Iris: Close
	User 1 Press (Mark Frame)	Record: Mark Frame
	Record Half Press	AF: Start
	Record Half Release	Key Disabled
	Record Full Press	Record: Toggle/Multi-Shot Start
	Record Full Release	Record: Multi-Shot Stop
	Focus Control Wheel CW[1]	Increase focus distance
	Focus Control Wheel CCW[1]	Decrease focus distance
DSMC2 Top Handle	Record Full Press	Record: Toggle/Multi-Shot Start
	Record Full Release	Record: Multi-Shot Stop
DSMC2 Outrigger Handle	Record Full Press	Record: Toggle/Multi-Shot Start
	Record Full Release	Record: Multi-Shot Stop

1. The Focus Control Wheel is NOT programmable; it cannot be mapped to another function.

APPENDIX F:
MENU MAP

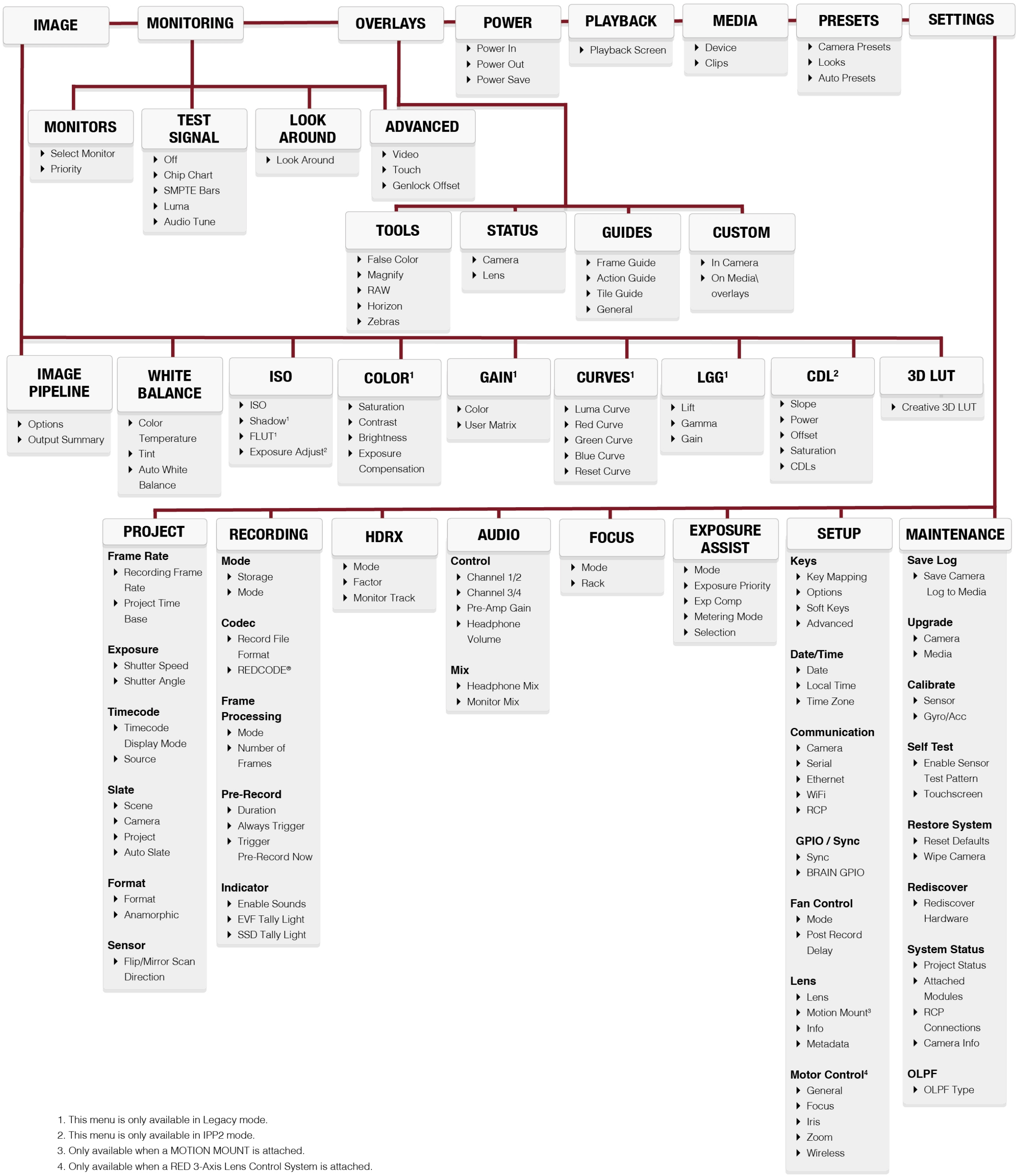


IMAGE
MONITORING
OVERLAYS
POWER
Power In
Power Out
Power Save
PLAYBACK
Playback Screen
MEDIA
Device
Clips
PRESETS
Camera Presets
Looks
Auto Presets
SETTINGS
MONITORS
Select Monitor
Priority
TEST SIGNAL
Off
Chip Chart
SMPTE Bars
Luma
Audio Tune
LOOK AROUND
Look Around
ADVANCED
Video
Touch
Genlock Offset
TOOLS
False Color
Magnify
RAW
Horizon
Zebras
STATUS
Camera
Lens
GUIDES
Frame Guide
Action Guide
Tile Guide
General
CUSTOM
In Camera
On Media\ overlays
IMAGE PIPELINE
Options
Output Summary
WHITE BALANCE
Color Temperature
Tint
Auto White Balance
ISO
ISO
Shadow[1]
FLUT[1]
Exposure Adjust[2]
COLOR[1]
Saturation
Contrast
Brightness
Exposure Compensation
GAIN[1]
Color
User Matrix
CURVES[1]
Luma Curve
Red Curve
Green Curve
Blue Curve
Reset Curve
LGG[1]
Lift
Gamma
Gain
CDL[2]
Slope
Power
Offset
Saturation
CDLs
3D LUT
Creative 3D LUT
PROJECT
Frame Rate
Recording Frame Rate
Project Time Base
Exposure
Shutter Speed
Shutter Angle
Timecode
Timecode Display Mode
Source
Slate
Scene
Camera
Project
Auto Slate
Format
Format
Anamorphic
Sensor
Flip/Mirror Scan Direction
RECORDING
Mode
Storage
Mode
Codec
Record File Format
REDCODE®
Frame Processing
Mode
Number of Frames
Pre-Record
Duration
Always Trigger
Trigger Pre-Record Now
Indicator
Enable Sounds
EVF Tally Light
SSD Tally Light
HDRX
Mode
Factor
Monitor Track
AUDIO
Control
Channel 1/2
Channel 3/4
Pre-Amp Gain
Headphone Volume
Mix
Headphone Mix
Monitor Mix
FOCUS
Mode
Rack
EXPOSURE ASSIST
Mode
Exposure Priority
Exp Comp
Metering Mode
Selection
SETUP
Keys
Key Mapping
Options
Soft Keys
Advanced
Date/Time
Date
Local Time
Time Zone
Communication
Camera
Serial
Ethernet
WiFi
RCP
GPIO / Sync
Sync
BRAIN GPIO
Fan Control
Mode
Post Record Delay
Lens
Lens
Motion Mount[3]
Info
Metadata
Motor Control[4]
General
Focus
Iris
Zoom
Wireless
MAINTENANCE
Save Log
Save Camera Log to Media
Upgrade
Camera
Media
Calibrate
Sensor
Gyro/Acc
Self Test
Enable Sensor Test Pattern
Touchscreen
Restore System
Reset Defaults
Wipe Camera
Rediscover
Rediscover Hardware
System Status
Project Status
Attached Modules
RCP Connections
Camera Info
OLPF
OLPF Type

1. This menu is only available in Legacy mode.
2. This menu is only available in IPP2 mode.
3. Only available when a MOTION MOUNT is attached.
4. Only available when a RED 3-Axis Lens Control System is attached.